MATHS

BOOKS - NIKITA MATHS (HINGLISH)

DIFFERENTIATION

MCQ

1. Which of the following is not true

A. A continuous function is always differentiable

B. A differentable function is always continous

C. A polynomial function is always continuous

D. e^x is continuous for all x

Answer: A

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2. Which of the following is not true always ?

A. If f(x) is continuous at x =a then it is differentiable at x=a

B. If f(x) is not cotinuous at x =a ,then it is not differentiable at x=a

C. If f(x) and g(x) are differentiable at x =a ,then f(x) +g(x) is also differentiable at x=a

D. If f(x) is continuous at x =a,then lim f(x) exists

Answer: A

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3. if f(x) $= \begin{cases} x & \text{for } x \geq 0 \\ -x & \text{for } x < 0 \end{cases} then$

A. f(x) is continuous at x =0 but not differentiable

B. f(x) is continuous and differentiable at x=0

C. f(x) is differentiable at x=0

D. f(x) is not continuous at x=0

Answer: A

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4. If f(x) $\begin{cases} x & \text{for } x \geq 0 \\ -x & \text{for } x < 0 \end{cases}$ *then* f(x) at x=0 is

A. continuous but not differentiable

B. not continuous but differentbale

C. continuous and differentiable

D. not continous and not differentiable

Answer: A

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5. It f(x) $= \begin{cases} \frac{x^2}{|x|} & \text{for } x \neq 0 \\ 0 & \text{for } x = 0 \end{cases}$ *then*

A. f '(x) axists in (-2,2)

B. f'(x) exists in (-1,1)

C. f(x) is discontinuous at x= 0

D. f(x) is continuous at x=0

Answer: D

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6. If f(x) = $\begin{cases} 1 + x & \text{for } x \leq 2 \\ 5 - x & \text{for } x > 2 \end{cases}$, *then*

A. f(x) is continuous and differentiable at x=2

B. f(x) is continuous at x=2 but not differentiable

C. f(x) is differentiable at x=2

D. f(x) is not continuous at x=2

Answer: B

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7. If f(x) $= \begin{cases} x - 1 & \text{for } x < 2 \\ 2x - 3 & \text{for } x \geq 2 \end{cases}$, *then* at x=2

A. f(x) is continuous but not differentiable

B. f (x) is continuous and differentiable

C. f (x) is not differentiable

D. f (x) is not continuous

Answer: A

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8. If f (x) $= \begin{cases} x & \text{for} 0 \leq x \leq 1 \\ 2x - 1 & \text{for } 1 < x \end{cases}$ *then*

A. f(x) is discontinuous at x=1

B. f (x) is differntiable at x=1

C. f(x) is continuous but not differentiable at x=1

D. f (x) is not continuous but differentiable at x=1

Answer: C

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9. If f(x) $= \begin{cases} x + 2 & \text{for } -2 < x < 3 \\ 5 & \text{for } x = 3 \\ 8 - x & f \text{ or } x > 3 \end{cases}$, *then* at x=3 ,f'(x) =

A. -1

B. 0

C. 1

D. does not exist

Answer: D

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10. If f(x) $= \begin{cases} 1 - 2x + 3x^2 - 4x^3 + ...\infty & \text{for} x \neq 1 \\ 1 & \text{for } x = -1 \end{cases}$, *then* f(x) is

A. continuous for all x $\in$ R

B. continuous but not differentiable at x=-1

C. continuous and differentiable at x = -1

D. not continous and not differentiable at x=-1

Answer: D

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11. The set of points where $f(x) = \dfrac{x}{1 + |x|}$ is differentiable is

A. $(-\infty, 0) \cup (0, \infty)$

B. $(-\infty, -1) \cup (-1, \infty)$

C. $(0, \infty)$

D. $(-\infty, \infty)$

Answer: D

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12. If f(x) =|x-1| ,x $\in$ R then at x =1

A. f(x) is not differentiable

B. f (x) is not continuous

C. f(x) is not continuous but not differentiable

D. f (x)is continuous and differentiable

Answer: A

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13. If f(x)=x -|x| is

A. differentiable at x=0

B. discontinuous at x=0

C. differentiable on R

D. continuous on R

Answer: D

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14. If f (x) =$|x - 1| + |x - 2|$,then at x=2

A. f (x) is differentiable

B. f(x) is not differentiable

C. $f'\left(2^{-}\right) = 2$

D. $f'\left(2^{+}\right) = 0$

Answer: D

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15. If f (x) = $\begin{cases} x\cos\left(\frac{1}{x}\right) & \text{for } x \neq 0 \\ 0 & \text{for } x = 0 \end{cases}$, *then* at x =0

A. f(x) is not continuous

B. f (x) is differentiable

C. f(x) is continuous and differentiable

D. f (x) is continuous but not differentiable

Answer: C

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16. IF f(x) $= \begin{cases} \frac{1}{2}\sin^2 x & \text{for } x \neq 0 \\ 0 & \text{for } x = 0 \end{cases}$, *then* at x=0

A. f (x) is not continuous

B. f(x) is not defferentiable

C. f(x) is not continuous and differentiable

D. f (x) is continuous but not differentiable

Answer: D

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17. If f(x) $\begin{cases} 1 & \text{for } \frac{-\pi}{2} < x < 0 \\ 1 + \sin x & \text{for} 0 \leq x < \frac{\pi}{2} \end{cases}$, *then* at x= 0 ,f'(x) -

A. 1

B. -1

C. ∞

D. does not exist

Answer: B

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18. If f(x) $=[x]$,where x is the greatest integer not greater than $x, \ -2 \leq x \leq 2,$ then at x= 1

A. f (x) is continuous and differentiable

B. f (x) is not continuous and not differentiable

C. f (x) is not continuous

D. f (x) is differentiable

Answer: A

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19. If f(x) is derivable at x =2, where $f(x) = \begin{cases} x^2 & \text{for} x \leq 2 \\ ax + b & \text{for } x > 2 \end{cases}, then$

A. a= 4 ,b=-4

B. a=-4 ,b=4

C. a=4,b=4

D. a=-4,b=-4

Answer: C

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20. If the function

$g(x) = \begin{cases} k\sqrt{x+1} & 0 \leq x \leq 3 \\ mx + 2 & 3 < x \leq 5 \end{cases}$ is differentiable, then the value of k+m is

A. $\frac{10}{30}$

B. $\frac{16}{5}$

C. 2

D. 4

Answer: D

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21. The value of m which the function $f(x)\begin{cases} mx^2 & \text{for } x \leq 1 \\ 2x & \text{for} x > 1 \end{cases}$ is differentiable at x= 1,is

A. 0

B. 1

C. 2

D. does not exist

Answer: C

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22. If f (x) $= \begin{cases} px^2 + q & \text{for } x \leq 1 \\ qx^2 + px + r & \text{for } xl > 1 \end{cases}$ where $q \neq 0$ is derivable at x =1 ,then

A. p=q,r=0

B. p=q ,r $\neq$ 0

C. p=2q,r=0

D. p=2q ,$r \neq 0$

Answer: B

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23. Let $f(x) = \begin{cases} x^n \sin \frac{1}{x} & x \neq 0 \\ 0 & x = 0 \end{cases}$ Then f(x) is continuous but not differentiable at x=0. If

A. $1 \leq p < \infty$

B. $0 < p \leq 1$

C. $-\infty < p < 0$

D. $p = 0$

Answer: C

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24. If f(x) = $\begin{cases} e^x + ax & \text{for } x < 0 \\ b(x-1)^2 & \text{for } x \geq 0 \end{cases}$, is differentiable at x =0,then (a,b) is

A. $(-3, -1)$

B. $(3, 1)$

C. $(-3, 1)$

D. $(3, -1)$

Answer: B

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25. If f (x)= $ae^{|x|} + b|x|^2, a, b \in$ R and f(x) is differentiable at x =0 ,then

A. a=1,b=3

B. a=0 ,b $\in$ R

C. a=1 ,b=2

D. a=2,b=3

Answer: B

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26. If $\lim_{x \to 2} \frac{f(x) - f(2)}{x - 2}$ exist ,then

A. $\lim_{x \to 2^-} f(x) \neq \lim_{x \to 2^+} f(x)$

B. $f(x)$ is differentiable

C. $\lim_{x \to 2} f(x) = f(2)$

D. $\lim_{x \to 2} f(x) \neq f(2)$

Answer: B

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27. If f is derivable at x =a,then $\lim_{x \to a}\left(\frac{xf(a) - af(x)}{x - a}\right)$

A. $af'(a) - f(a)$

B. $f(a) - af'(a)$

C. $af(a)$

D. $-af'(a)$

Answer: B

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28. If the relation f'(a+b) =f'(a)+ f '(b) and $\frac{d}{dx}(f(x)) = f'(x)$,then f(x) =

A. x^4

B. x^2

C. x^3

D. x

Answer: C

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29. Derivative of even function is

A. non-negative

B. even function

C. odd function

D. zero

Answer: B

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30. Derivative of odd function is

A. non-positive

B. even function

C. zero

D. odd function

Answer: D

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31. If f (x) is polynomial of degree two and f(0) =4 f'(0) =3,f''(0) =4,then f(-1) =

A. 2

B. -2

C. 3

D. -3

Answer: C

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32. If f (x) is a polynomial of degree two and f(0) =4 f'(0) =3,f'' (0) 4 then f(-1) =

A. 2

B. -2

C. 3

D. -3

Answer: A

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33. let $f(x)$ be a polynomial function of second degree. If $f(1) = f(-1)$ and a_1, a_2, a_3 are in AP, then show that $f'\left(a_1\right), f'\left(a_2\right), f'\left(a_3\right)$

are in AP.

A. A .P.

B. G.P.

C. H.P

D. A.G.P.

Answer: B

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34. For $x \in R, f(x) = |\log 2 - \sin x|$ and $g(x) = f(f(x))$, then

A. g is not differentiable at x=0

B. $g'(0) = \cos(\log 2)$

C. $g(0) = -\cos(\log 2)$

D. g is differentiable at x =0 and g '(0) $= -\sin(\log 2)$

Answer: A

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35. $y = \left(5x^3 - 4x^2 - 8x\right)^9, find \frac{dy}{dx}$

A. $9\left(5x^3 - 4x^2 - 8x\right)^8\left(15x^2 - 8x - 8\right)$

B. $9\left(5x^3 - 4x^2 - 8x\right)^9\left(15x^2 - 8x - 8\right)$

C. $9\left(5x^3 - 4x^2 - 8x\right)^8\left(5x^2 - 8x - 8\right)$

D. $9\left(5x^3 - 4x^2 - 8x\right)^9\left(5x^2 - 8x - 8\right)$

Answer: A

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36. If y = $\frac{1}{\left(x^2 + 3\right)}, then \frac{dy}{dx} =$

A. $\frac{-2x}{\left(x^2 + 3\right)^2}$

B. $\dfrac{2x}{\left(x^2+3\right)^3}$

C. $\dfrac{-4x}{\left(x^2+3\right)^2}$

D. $\dfrac{4x}{\left(x^2+3\right)^3}$

Answer: A

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37. If y= $\sqrt{x+\dfrac{1}{x}}, then \dfrac{dy}{dx}=$

A. $\dfrac{x^2-1}{2x^2\sqrt{x^2+1}}$

B. $\dfrac{1-x^2}{2x^2\sqrt{x^2+1}}$

C. $\dfrac{x^2-1}{2x\sqrt{x}\sqrt{x^2+1}}$

D. $\dfrac{1-x^2}{2x\sqrt{x}\sqrt{x^2+1}}$

Answer: C

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38. If y= $\left(\sqrt{x}+\frac{1}{\sqrt{x}}\right)^{5}$, then $\frac{dy}{dx}$ =

A. $\frac{5(x-1)}{2x\sqrt{x}}\left(\sqrt{x}+\frac{1}{\sqrt{x}}\right)^{4}$

B. $\frac{5(1-x)}{2x\sqrt{x}}\left(\sqrt{x}+\frac{1}{\sqrt{x}}\right)$

C. $\frac{5(x-1)}{2\sqrt{x}}\left(\sqrt{x}+\frac{1}{\sqrt{x}}\right)$

D. $\frac{5(1-x)}{2\sqrt{x}}\left(\sqrt{x}+\frac{1}{\sqrt{x}}\right)^{4}$

Answer: A

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39. If $y=3\sqrt{\left(2x^{2}-7x-4\right)^{5}}$, then $\frac{dy}{dx}$ =

A. $\frac{5}{3}\left(2x^3 - 7x - 4\right)^{\frac{2}{3}}(2x - 7)$

B. $\frac{5}{3}\left(2x^3 - 7x - 4\right)^{\frac{2}{3}}(4x - 7)$

C. $\frac{5}{3}\left(2x^3 - 7x - 4\right)^{\frac{3}{2}}(2x - 7)$

D. $\frac{5}{3}\left(2x^3 - 7x - 4\right)^{\frac{3}{2}}(4x - 7)$

Answer: B

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40. If $y = \sqrt{x + \sqrt{x + \sqrt{x}}}, then \frac{dy}{dx} =$

A. $\frac{1}{\sqrt{x + \sqrt{x + \sqrt{x}}}}\left(1 + \frac{1}{\sqrt{x + \sqrt{x}}}\left(1 + \frac{1}{\sqrt{x}}\right)\right)$

B. $\frac{1}{2\sqrt{x + \sqrt{x + \sqrt{x}}}}\left(1 + \frac{1}{\sqrt{x + \sqrt{x}}}\left(1 + \frac{1}{\sqrt{x}}\right)\right)$

C. $\frac{1}{2\sqrt{x + \sqrt{x + \sqrt{x}}}}\left(1 + \frac{1}{2\sqrt{x + \sqrt{x}}}\left(1 + \frac{1}{\sqrt{x}}\right)\right)$

D. $\frac{1}{2\sqrt{x + \sqrt{x + \sqrt{x}}}}\left(1 + \frac{1}{2\sqrt{x + \sqrt{x}}}\left(1 + \frac{1}{2\sqrt{x}}\right)\right)$

Answer: D

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41. If $y = \sqrt{\frac{1 - x}{1 + x}}$, then $\left(1 - x^2\right)\frac{dy}{dx} + y$ is equal to

A. 1

B. -1

C. 2

D. 0

Answer: D

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42. If $y = \frac{1}{\sqrt{3x + 7}} - \frac{1}{\sqrt{7 - 3x}}, then \frac{dy}{dx} =$

A. $\frac{3}{2}\left(\frac{1}{(3x+7)^{\frac{3}{2}}} - \frac{1}{(7-3x)^{\frac{3}{2}}}\right)$

B. $\frac{-3}{2}\left(\frac{1}{(3x+7)^{\frac{3}{2}}} - \frac{1}{(7-3x)^{\frac{3}{2}}}\right)$

C. $\frac{3}{2}\left(\frac{1}{(3x+7)^{\frac{3}{2}}} + \frac{1}{(7-3x)^{\frac{3}{2}}}\right)$

D. $\frac{-3}{2}\left(\frac{1}{(3x+7)^{\frac{3}{2}}} + \frac{1}{(7-3x)^{\frac{3}{2}}}\right)$

Answer: D

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43. If y= $1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \ldots\ldots\infty, then \frac{dy}{dx}$ =

A. y

B. $-y$

C. 1

D. 0

Answer: A

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44. If y = $\frac{1}{1+x^{p-r}+x^{q-r}}+\frac{1}{1+x^{p-q}+x^{r-q}}+\frac{1}{1+x^{q-p}+x^{r-p}}, then \frac{dy}{dx} =$

A. x^{p+q+r}

B. $x^{p+q+r-1}$

C. 1

D. 0

Answer: D

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45. If y $= \sqrt{a^2 + \sqrt{a^2 + x^2}}, then \dfrac{dy}{dx} =$

A. $\dfrac{ax}{4\sqrt{a^2 + x^2}\sqrt{a^2 + \sqrt{a^2 + x^2}}}$

B. $\dfrac{ax}{2\sqrt{a^2 + x^2}\sqrt{a^2 + \sqrt{a^2 + x^2}}}$

C. $\dfrac{x}{4\sqrt{a^2 + x^2}\sqrt{a^2 + \sqrt{a^2 + x^2}}}$

D. $\dfrac{x}{2\sqrt{a^2 + x^2}\sqrt{a^2 + \sqrt{a^2 + x^2}}}$

Answer: D

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46. If y $= \sin\left(x^2 + x\right), then \dfrac{dy}{dx} =$

A. $-(2x + 1)\cos\left(x^2 + x\right)$

B. $(2x + 1)\cos\left(x^2 + x\right)$

C. $2x\cos\left(x^2 + 5\right)$

D. $(2x+5)\cos\left(x^2+5\right)$

Answer: B

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47. If $y=\sin\left(x^2+5\right)$, $then\dfrac{dy}{dx}=$

A. $x\cos\left(x^2+5\right)$

B. $(x+5)\cos\left(x^2+5\right)$

C. $2x\cos\left(x^2+5\right)$

D. $(2x+5)\cos\left(x^2+5\right)$

Answer: C

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48. If $y=\sin\left(ax^2+bx+c\right)then\dfrac{dy}{dx}=$

A. $(2ax+b)\sin\left(ax^2+bx+c\right)$

B. $(2ax+b)\cos\left(ax^2+bx+c\right)$

C. $(2ax+2b)\cos\left(ax^2+bx+c\right)$

D. $(2ax+2b)\sin\left(ax^2+bx+c\right)$

Answer: A

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49. If $y=\sin\left(x^2+x+5\right)$, then $\dfrac{dy}{dx}=$

A. $-(x+1)\cos\left(x^2+x+5\right)$

B. $(x+1)\cos\left(x^2+x+5\right)$

C. $-(2x+1)\cos\left(x^2+x+5\right)$

D. $(2x+1)\cos\left(x^2+x+5\right)$

Answer: D

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50. If $y = \sin(\cos(\tan x))$, *then* $\dfrac{dy}{dx} =$

A. $-\sin(\cos(\tan x))\sin(\tan x)\sec^2 x$

B. $\sin(\cos(\tan x))\sin(\tan x)\sec^2 x$

C. $-\cos(\cos(\tan x))\sin(\tan x)\sec^2 x$

D. $\cos(\cos(\tan x))\sin(\tan x)\sec^2 x$

Answer: C

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51. If y= $\sin\sqrt{\sin\sqrt{x}}$, *then* $\dfrac{dy}{dx} =$

A. $\dfrac{\cos\sqrt{x}\cos\sqrt{\sin\sqrt{x}}}{2\sqrt{x}\sin\sqrt{x}}$

B. $\dfrac{\cos\sqrt{x}\cos\sqrt{\sin\sqrt{x}}}{2\sqrt{\sin\sqrt{x}}}$

C. $\dfrac{\cos\sqrt{x}\cos\sqrt{\sin\sqrt{x}}}{4\sqrt{x}\sin\sqrt{x}}$

D. $\dfrac{\cos\sqrt{x}\cos\sqrt{\sin\sqrt{x}}}{4\sqrt{\sin\sqrt{x}}}$

Answer: C

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52. If $y = \cos\sqrt{x}, then \dfrac{dy}{dx}$ =

A. $\dfrac{\sin\sqrt{x}}{2\sqrt{x}}$

B. $\dfrac{-\sin\sqrt{x}}{2\sqrt{x}}$

C. $\dfrac{\sin\sqrt{x}}{2x\sqrt{x}}$

D. $\dfrac{-\sin\sqrt{x}}{2x\sqrt{x}}$

Answer: B

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53. $If y = \cos\left(2x + 45^\circ\right), then \frac{dy}{dx} =$

A. $2\sin\left(2x + 45^\circ\right)$

B. $-2\sin\left(2x + 45^\circ\right)$

C. $\frac{\pi}{90}\sin\left(2x + 45^\circ\right)$

D. $\frac{-\pi}{90}\sin\left(2x + 45^\circ\right)$

Answer: D

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54. If $y = \cos(\sin x)$,then $\frac{dy}{dx} =$

A. $(\sin x)\sin(\sin x)$

B. $-(\sin x)\sin(\sin x)$

C. $(\cos x)\sin(\sin x)$

D. $-(\cos x)\sin(\sin x)$

Answer: D

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55. $Ify = \cos\left(x^2e^x\right), then\frac{dy}{dx} =$

A. $e^x\left(x^2 + 2\right)\sin\left(x^2e^x\right)$

B. $-e^x\left(x^2 + 2\right)\sin\left(x^2e^x\right)$

C. $xe^x(x + 2)\sin\left(x^2e^x\right)$

D. $-xe^x(x + 2)\sin\left(x^2e^x\right)$

Answer: B

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56. $Ify = \frac{1}{\cot(a\tan x + b\cos x)}, then\frac{dy}{dx}$

A. $\left(a\sec^2x + b\mathrm{cosec}^2x\right)\sec^2(a\tan x + b\cot x)$

B. $\left(a\sec^2 x - b\operatorname{cosec}^2 x\right)\sec^2(a\tan x + b\cot x)$

C.

D. $\left(a\sec^2 x - b\operatorname{cosec}^2 x\right)\operatorname{cosec}^2(a\tan x + b\cot x)$

Answer: B

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57. If $y = \sec\left(\tan\sqrt{x}\right)$, then $\frac{dy}{dx} =$

A. $\frac{\tan\sqrt{x}\sec^2\sqrt{x}\sec\left(\tan\sqrt{x}\right)}{2\sqrt{x}}$

B. $\frac{\sec^2\sqrt{x}\sec\left(\tan\sqrt{x}\right)\tan\left(\tan\sqrt{x}\right)}{2\sqrt{x}}$

C. $\frac{\sec^2\sqrt{x}\sec\left(\tan\sqrt{x}\right)\tan\left(\tan\sqrt{x}\right)}{\sqrt{x}}$

D. $\frac{\tan\sqrt{x}\sec^2\sqrt{x}\sec\left(\tan\sqrt{x}\right)}{\sqrt{x}}$

Answer: A

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58. If $y = \sqrt{\sin x}$, *then* $\frac{dy}{dx} =$

A. $\frac{\cos x}{2\sqrt{\sin x}}$

B. $\frac{-\cos x}{2\sqrt{\sin x}}$

C. $\frac{\cos x}{\sqrt{\sin x}}$

D. $\frac{-\cos x}{\sqrt{\sin x}}$

Answer: A

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59. $If y = \sqrt{\sin\sqrt{x}}$, *then* $\frac{dy}{dx} =$

A. $\frac{\cos\sqrt{x}}{2\sqrt{\sin\sqrt{x}}}$

B. $\frac{\cos\sqrt{x}}{4\sqrt{\sin\sqrt{x}}}$

C. $\dfrac{\cos\sqrt{x}}{2\sqrt{x}\sin\sqrt{x}}$

D. $\dfrac{\cos\sqrt{x}}{4\sqrt{x\sin\sqrt{x}}}$

Answer: D

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60. $y = \sin^2(\log(2x+3)), find \dfrac{dy}{dx}$

A. $\dfrac{-\sin(2\log(2x+3))}{2x+3}$

B. $\dfrac{\sin(\log(4x+6))}{2x+3}$

C. $\dfrac{2\sin(\log(4x+6))}{2x+3}$

D. $\dfrac{2\sin(2\log(2x+3))}{2x+3}$

Answer: A

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61. $If y = \sin^{\frac{2}{5}}(\log x), then \frac{dy}{dx} =$

A. $\frac{2}{5x}\cos(\log x)\sin^{\frac{-3}{5}}(\log x)$

B. $\frac{-2}{5x}\cos(\log x)\sin^{\frac{-3}{5}}(\log x)$

C. $\frac{2}{5x}\sin(\log x)\sin^{\frac{-2}{3}}(\log x)$

D. $\frac{-2}{5x}\sin(\log x)\sin^{\frac{-2}{3}}(\log x)$

Answer: B

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62. $If y = \cos^2(\log(2x+3)), then \frac{dy}{dx} =$

A. $\frac{2\sin(2\log(2x+3))}{2x+3}$

B. $\frac{-2\sin(2\log(2x+3))}{2x+3}$

C. $\frac{\sin(2\log(2x+3))}{2x+3}$

D. $\frac{-\sin(2\log(2x+3))}{2x+3}$

Answer: A

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63. $If y = \sqrt{\tan\sqrt{x}}, then \frac{dy}{dx} =$

A. $\frac{\sec^2\sqrt{x}}{4\sqrt{x\tan\sqrt{x}}}$

B. $\frac{\sec^2\sqrt{x}}{2\sqrt{x\tan\sqrt{x}}}$

C. $\frac{\sec^2\sqrt{x}}{4\sqrt{\tan x\sqrt{x}}}$

D. $\frac{\sec^2\sqrt{x}}{2\sqrt{\tan x}\sqrt{x}}$

Answer: C

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64. if $y = \tan^2\left(\log x^3\right)$, find $\frac{dy}{dx}$.

A. $\frac{2}{x}\tan\left(\log x^3\right)\sec^2\left(\log x^3\right)$

B. $\frac{3}{x}\tan\left(\log x^3\right)\sec^2\left(\log x^3\right)$

C. $\frac{6}{x}\tan\left(\log x^3\right)\sec^2\left(\log x^3\right)$

D. $\frac{2}{x}\tan\left(\log x^3\right)\sec^2\left(\log x^3\right)$

Answer: D

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65. $\frac{d}{dx}(\mathrm{cosec}x + \cot x) =$

A. $\mathrm{cosec}x(\mathrm{cosec}x - \cot x)$

B. $-\mathrm{cosec}x(\mathrm{cosec}x - \cot x)$

C. $\mathrm{cosec}x(\mathrm{cosec}x + \cot x)$

D. $-\mathrm{cosec}x(\mathrm{cosec}x + \cot x)$

Answer: D

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66. $If y = \sqrt{\sin x + \sqrt{\cos x}}, then \frac{dy}{dx} =$

A. $\frac{2\cos x\sqrt{\cos x} - \sin x}{4\sqrt{\cos x\sqrt{\sin x + \sqrt{\cos x}}}}$

B. $\frac{2\cos x\sqrt{\cos x} + \sin x}{4\sqrt{\cos x\sqrt{\sin x + \sqrt{\cos x}}}}$

C. $\frac{2\cos x\sqrt{\cos x} - \sin x}{2\sqrt{\cos x\sqrt{\sin x + \sqrt{\cos x}}}}$

D. $\frac{2\cos x\sqrt{\cos x} + \sin x}{2\sqrt{\cos x\sqrt{\sin x + \sqrt{\cos x}}}}$

Answer: A

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67. $If y = \frac{1}{3\sqrt{\operatorname{cosec} x + \cot x}}, then \frac{dy}{dx} =$

A. $\frac{4\operatorname{cosec} x}{3\sqrt{\operatorname{cosec} x + \cot x}}$

B. $\frac{-4\operatorname{cosec} x}{3\sqrt{\operatorname{cosec} x + \cot x}}$

C. $\frac{1}{3}\frac{\operatorname{cosec}x}{3\sqrt{\operatorname{cosec}x + \cot x}}$

D. $\frac{-\operatorname{cosec}x}{3\sqrt{\operatorname{cosec}x + \cot x}}$

Answer: C

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68. If $r = \left[2\phi + \cos^2\left(2\phi + \frac{\pi}{4}\right)\right]^{1/2}$, then $dr/d\phi$ at $\phi = \pi/4$

A. $2\left(\frac{1}{\pi + 1}\right)^{\frac{-1}{2}}$

B. $2\left(\frac{2}{\pi + 1}\right)^{\frac{-1}{2}}$

C. $2\left(\frac{1}{\pi + 1}\right)^{\frac{1}{2}}$

D. $2\left(\frac{2}{\pi + 1}\right)^{\frac{1}{2}}$

Answer: D

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69. If y= $\sqrt{\cos x} + \sqrt{\cos\sqrt{x}}$, *then* $\frac{dy}{dx}$

A. $\frac{-\sin x}{2\sqrt{\cos x}} - \frac{\sin\sqrt{x}}{4\sqrt{x\cos\sqrt{x}}}$

B. $\frac{-\sin x}{2\sqrt{\cos x}} + \frac{\sin\sqrt{x}}{2\sqrt{x\cos\sqrt{x}}}$

C. $\frac{\sin x}{2\sqrt{\cos x}} - \frac{\sin\sqrt{x}}{4\sqrt{x\cos\sqrt{x}}}$

D. $\frac{\sin x}{2\sqrt{\cos x}} + \frac{\sin\sqrt{x}}{4\sqrt{x\cos\sqrt{x}}}$

Answer: A

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70. If $y = \sqrt{\sin^3(5x+3)} + \sqrt{\cos^3(5x+3)}$, *then* $\frac{dy}{dx} =$

A. $\frac{3}{2}\cos(5x+3)\sqrt{\sin(5x+3)} - \frac{3}{2}\sin(5x+3)\sqrt{\cos(5x+3)}$

B. $\frac{3}{2}\cos(5x+3)\sqrt{\sin(5x+3)} + \frac{3}{2}\sin(5x+3)\sqrt{\cos(5x+3)}$

C. $\frac{15}{2}\cos(5x+3)\sqrt{\sin(5x+3)} - \frac{15}{2}\sin(5x+3)\sqrt{\cos(5x+3)}$

D. $\frac{15}{2}\cos(5x+3)\sqrt{\sin 5x+3}$ - $\frac{15}{2}\sin(5x+3)\sqrt{\cos 5x_{+}3}$

Answer: C

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71. If $y = \tan\left(2x^{\circ}\right) - \sin\left(3x^{\circ}\right), then\frac{dy}{dx} =$

A. $\frac{\pi}{90}\sec^2\left(2x^{\circ}\right) - \frac{\pi}{60}\cos\left(3x^{\circ}\right)$

B. $\frac{\pi}{90}\sec^2\left(2x^{\circ}\right) - \frac{\pi}{90}\cos\left(3x^{\circ}\right)$

C. $\frac{\pi}{60}\sec^2\left(2x^{\circ}\right) - \frac{\pi}{60}\cos\left(3x^{\circ}\right)$

D. $\frac{\pi}{180}\sec^2\left(2x^{\circ}\right) - \frac{\pi}{180}\cos\left(3x^{\circ}\right)$

Answer: A

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72. If $f(x) = \cos x\cos 2x\cos 4x\cos(8x).\ \cos 16x$ then find $f'\left(\frac{\pi}{4}\right)$

A. $\frac{1}{\sqrt{2}}$

B. $\frac{\sqrt{3}}{2}$

C. $\sqrt{2}$

D. 1

Answer: C

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73. If $y = \cos\left(x^3\right)\sin^2\left(x^5\right)$, $then\frac{dy}{dx} =$

A. $5x^4\sin\left(x^3\right)\sin\left(2x^5\right) - 3x^2\cos\left(x^3\right)\sin\left(x^5\right)$

B. $5x^4\sin\left(x^3\right)\sin\left(2x^5\right) + 3x^2\cos\left(x^3\right)\sin\left(x^5\right)$

C. $5x^4\sin\left(x^3\right)\sin\left(2x^5\right) - 3x^2\sin\left(x^3\right)\sin^2\left(x^5\right)$

D. $5x^4\sin\left(x^3\right)\sin\left(2x^5\right) + 3x^2\sin\left(x^3\right)\sin^2\left(x^5\right)$

Answer: C

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74. $Ify = \sin^2 3x\tan^3 2x, then\frac{dy}{dx} =$

A. $\sin 3x\tan^2 2x\left(2\sin 3x\sec^2 2x + 3\cos 3x\tan 3x\right)$

B. $2\sin 3x\tan^2 2x\left(2\sin 3x\sec^2 2x + 3\cos 3x\tan 3x\right)$

C. $3\sin 3x\tan^2 2x\left(2\sin 3x\sec^2 2x + 3\cos 3x\tan 3x\right)$

D. $6\sin 3x\tan^2 2x\left(2\sin 3x\sec^2 2x + 3\cos 3x\tan 3x\right)$

Answer: D

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75. $\left(\frac{\sin^m x}{\sin^n x}\right)^{m+n} \cdot \left(\frac{\sin^n x}{\sin^q x}\right)^{n+q}\left(\frac{\sin^q x}{\sin^m x}\right)^{q+m}$

A. $\sin x$

B. $\cos x$

C. 1

D. 0

Answer: D

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76. $If y = \frac{\cos x - \sin x}{\cos x + sin x}, then \frac{dy}{dx} =$

A. $\frac{2}{1 + \sin 2x}$

B. $\frac{-2}{1 + \sin 2x}$

C. $\frac{1}{1 + \sin 2x}$

D. $\frac{-1}{1 + \sin 2x}$

Answer: B

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77. $If y = \frac{\sin^2 x}{1 + \cos^2 x}, then \frac{dy}{dx} =$

A. $\frac{-\sin 2x}{\left(1 + \cos^2 x\right)^2}$

B. $\frac{\sin 2x}{\left(1 + \cos^2 x\right)^2}$

C. $\frac{-2\sin 2x}{\left(1 + \cos^2 x\right)}$

D. $\frac{2\sin 2x}{\left(1 + \cos^2 x\right)^2}$

Answer: D

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78. $If y = \frac{\sec x^\circ + \tan x^\circ}{\sec^\circ - \tan x^\circ}, then \frac{dy}{dx}$

A. $\frac{\pi}{180}\tan\left(\frac{\pi}{4} + \frac{x^\circ}{2}\right)\sec^2\left(\frac{\pi}{4} + \frac{x^\circ}{2}\right)$

B. $\frac{-\pi}{180}\tan\left(\frac{\pi}{4} + \frac{x^\circ}{2}\right)\sec^2\left(\frac{\pi}{4} + \frac{x^\circ}{2}\right)$

C. $\frac{-\pi}{360}\tan\left(\frac{\pi}{4}+\frac{x^{\circ}}{2}\right)\sec^2\left(\frac{\pi}{4}+\frac{x^{\circ}}{2}\right)$

D. $\frac{-\pi}{90}\tan\left(\frac{\pi}{4}+\frac{x^{\circ}}{2}\right)\sec^2\left(\frac{\pi}{4}+\frac{x^{\circ}}{2}\right)$

Answer: A

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79. If $y=\sqrt{\frac{1+\sin x}{1-\sin x}}, then \frac{dy}{dx}=$

A. $\frac{-1}{1-\sin x}$

B. $\frac{1}{1-\sin x}$

C. $\frac{-2}{1-\sin x}$

D. $\frac{2}{1-\sin x}$

Answer: B

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80. If $y=\sqrt{\frac{1-\sin 10x}{1+\sin 10x}}$, *then* $\frac{dy}{dx}=$

A. $5\sec^2\left(\frac{\pi}{4}-5x\right)$

B. $-5\sec^2\left(\frac{\pi}{4}-5x\right)$

C. $5\sec^2\left(\frac{\pi}{4}+5x\right)$

D. $-5\sec^2\left(\frac{\pi}{4}+5x\right)$

Answer: B

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81. If $y=\sqrt{\frac{1-\tan 2x}{1+\tan 2x}}$, *then* $\frac{dy}{dx}=$

A. $-\sec^2\left(\frac{\pi}{4}-2x\right)\sqrt{\frac{1-\tan 2x}{1+\tan 2x}}$

B. $\sec^2\left(\frac{\pi}{4}-2x\right)\sqrt{\frac{1-\tan 2x}{1+\tan 2x}}$

C. $-\sec^2\left(\frac{\pi}{4}-2x\right)\sqrt{\frac{1+\tan 2x}{1-\tan 2x}}$

D. $\sec^2\left(\frac{\pi}{4}-2x\right)\sqrt{\frac{1+\tan 2x}{1-\tan 2x}}$

Answer: C

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82. If $y=e^{5x^2-x+3}$, then $\frac{dy}{dx}=$

A. $(5x-1)e^{5x^2-x+3}$

B. $\left(5x^2-1\right)e^{5x^2-x+3}$

C. $\left(10x^2-1\right)e^{5x^2-x+3}$

D. $(10x-1)e^{5x^2-x+3}$

Answer: D

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83. If $y = e^{\text{cosec}_x}, \textit{then}\dfrac{dy}{dx} =$

A. $2e^{\text{cosec}_x}$, $\text{cosec}x\text{cot}x$

B. $-2e^{\text{cosec}_x}$, $\text{cosec}x\text{cot}x$

C. $-2e^{\text{cosec}_x}$, $\text{cosec}^2x\text{cot}x$

D. $-2e^{\text{cosec}_x}$, $\text{cosec}^2x\text{cot}x$

Answer: D

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84. If $y = e^{x\sin 2x + \cos 2x}, \textit{then}\dfrac{dy}{dx} =$

A. $(2x\cos 2x - \sin 2x)e^{x\sin 2x + \cos 2x}$

B. $(2x\cos 2x + \sin 2x)e^{x\sin 2x + \cos 2x}$

C. $(2\cos 2x - x\sin 2x)e^{x\sin 2x + \cos 2x}$

D. $(2\cos 2x + x\sin 2x)e^{x\sin 2x + \cos 2x}$

Answer: A

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85. If $y = e^{x^2\sin^2 x + \cos^2 x}$, $then \dfrac{dy}{dx} =$

A. $\left(2x\sin^2 x - (x-1)\sin 2x\right)e^{x^2\sin^2 x + \cos^2 x}$

B. $\left(2x\sin^2 x + (x-1)\sin 2x\right)e^{x^2\sin^2 x + \cos^2 x}$

C. $\left(2x\sin^2 x - \left(x^2-1\right)\sin 2x\right)e^{x^2\sin^2 x + \cos^2 x}$

D. $\left(2x\sin^2 x + \left(x^2-1\right)\sin 2x\right)e^{x^2\sin^2 x + \cos^2 x}$

Answer: D

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86. If y $= e^{\log x}$, $then \dfrac{dy}{dx}$

A. $e^{\log x}$

B. $\frac{1}{x}$

C. 0

D. 1

Answer: D

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87. If y= $e^{\log(\log x)}$, *then* $\frac{dy}{dx}$ =

A. $\frac{1}{x}$

B. $\frac{1}{\log x}$

C. $\frac{1}{x\log x}$

D. $\frac{x}{\log x}$

Answer: A

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88. $If y = 7^{x+\frac{1}{x}}, then \frac{dy}{dx} =$

A. $7^{x+\frac{1}{x}}(\log 7)\left(\frac{x^2-1}{x^2}\right)$

B. $-7^{x+\frac{1}{x}}(\log 7)\left(\frac{x^2-1}{x^2}\right)$

C. $7^{x+\frac{1}{x}}\left(\frac{x^2-1}{x^2}\right)$

D. $-7^{x+\frac{1}{x}}\left(\frac{x^2-1}{x^2}\right)$

Answer: A

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89. If $y = a^{\log(1+\log x)}, then \frac{dy}{dX}$

A. $\frac{a^{\log(1+\log x)}\log a}{x+\log x}$

B. $\frac{a^{\log(1+\log x)}\log a}{x+(1+\log x)}$

C. $\dfrac{a^{\log(1+\log x)}\log a}{1+\log x}$

D. $\dfrac{a^{\log(1+\log x)}\log a}{1+x\log x}$

Answer: B

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90. If $y=\left(a^{\sqrt{x}}\right)^{\sin x}$, *then* $\dfrac{dy}{dx}=$

A. $a^{\sqrt{x}\sin x}(\log a)\left(\sqrt{x}\cos x-\dfrac{\sin x}{\sqrt{x}}\right)$

B. $a^{\sqrt{x}\sin x}(\log a)\left(\sqrt{x}\cos x+\dfrac{\sin x}{\sqrt{x}}\right)$

C. $a^{\sqrt{x}\sin x}(\log a)\left(\sqrt{x}\cos x+\dfrac{\sin x}{2\sqrt{x}}\right)$

D. $a^{\sqrt{x}\sin x}(\log a)\left(\sqrt{x}\cos x-\dfrac{\sin x}{2\sqrt{x}}\right)$

Answer: C

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91. If $y = 5^{e^{x\sin x}}$, $then \dfrac{dy}{dx} =$

A. $\left(\sin^2 x + 2\sin 2x\right)(\log 5)5^{e^{x\sin^2 x e^x}}$

B. $\left(\sin^2 x - 2\sin 2x\right)(\log 5)5^{e^{x\sin^2 x_e^x}}$

C. $\left(\sin^2 x + \sin 2x\right)(\log 5)5^{e^{x\sin^2 x_e^x}}$

D. $\left(\sin^2 x - \sin 2x\right)(\log 5)5^{e^{x\sin^2 x_e^x}}$

Answer: C

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92. If $y = a^{5\sin(x)}$, $then \dfrac{dy}{dx} =$

A. $\left(\log_5 a\right)(\cos x)a^{5\sin x}5^{\sin x}$

B. - $\left(\log_5 a\right)(\cos x)a^{5\sin x}5^{\sin x}$

C. $(\log a)(\log 5)(\cos x)a^{5\sin x}5^{\sin x}$

D. - $(\log a)(\log 5)(\cos x)a^{5\sin x}5^{\sin x}$

Answer: C

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93. If $y=(10)^{(10)^{\log_{10}^{cosec(10x)}}}$, $then\frac{dy}{dx}=$

A. $-10\cos ec(10x)\cot(10x)(\log 10)10^{cosec(10x)}$

B. $10\cos ec(10x)\cot(10x)(\log 10)10^{cosec(10x)}$

C. $-10\cos ec(10x)\cot(10x)(\log 10)^2 10^{cosec(10x)}$

D. $10\cos ec(10x)\cot(10x)(\log 10)^2 10^{cosec(10x)}$

Answer: A

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94. If $y=2^{\sin x}-\sin^2 x$, $then\frac{dy}{dx}=$

A. $\left(2\sin^x\log 2-2\sin x\right)(\cos x)$

B. $\left(2\sin^{x}\log 2 - \sin x\right)(\cos x)$

C. $-\left(2\sin^{x}\log 2 - 2\sin x\right)(\cos x)$

D. $-\left(2\sin^{x}\log 2 - \sin x\right)(\cos x)$

Answer: A

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95. If $y = 4^{\log_2 \sin x} + 9^{\log_3 \cos x}, \, then \dfrac{dy}{dx} =$

A. 1

B. 0

C. $\sin 2x$

D. $-\sin 2x$

Answer: B

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96. If $y = 4^{\log_2 \sin x} - 9^{\log_3 \cos x}, \textit{then} \dfrac{dy}{dx} =$

A. 1

B. 0

C. $\sec^2 x$

D. $-\tan^2 x$

Answer: B

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97. $y = 4^{\log_2 \operatorname{cosec} x} - 9^{\log_3 \cot x}, \textit{then} \dfrac{dy}{dx} =$

A. 1

B. 0

C. $2x$

D. x

Answer: B

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98. If $y = e^{x + 2\log x}, then \frac{dy}{dx} =$

A. $x\left(x^2 + 2\right)e^x$

B. $x\left(x^2 + 2\right)e^{2x}$

C. $x(x + 2)e^x$

D. $x(x + 2)e^{2x}$

Answer: C

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99. If $y = e^{x^5 e^x}, then \frac{dy}{dx} =$

A. $\left(5x^4 + 1\right)e^{x^5 + x}$

B. $\left(5x^4 - 1\right)e^{x^5 + x}$

C. $\left(5x^4 + x\right)e^{x^5 + x}$

D. $\left(5x^4 - x\right)e^{x^5 + x}$

Answer: A

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100. If $y = 5^x x^5$, then $\frac{dy}{dx}$ is

A. $5^x x^4 (5 + \log 5)$

B. $5^x x^5 (5 + \log 5)$

C. $5^x x^4 (5 + x\log 5)$

D. $5^x x^5 (5 + x\log 5)$

Answer: C

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101. If $y = e^{\cot x}\tan\left(xe^{x}\right)$, then $\frac{dy}{dx} =$

A. $e^{\cot x}\left(e^{x}(x+1)\right)\sec^{2}\left(xe^{x}\right) + \left(\operatorname{cosec}^{2}x\right)\tan\left(xe^{x}\right)\Big)$

B. $e^{\cot x}\left(e^{x}(x+1)\right)\sec^{2}\left(xe^{x}\right) - \left(\operatorname{cosec}^{2}x\tan\left(xe^{x}\right)\right)$

C. $e^{\cot x}\left(e^{x}(x-1)\right)\sec^{2}\left(xe^{x}\right) + \left(\operatorname{cosec}^{2}x\tan\left(xe^{x}\right)\right)$

D. $e^{\cot x}\left(e^{x}(x-1)\right)\sec^{2}\left(xe^{x}\right) - \left(\operatorname{cosec}^{2}x\tan\left(xe^{x}\right)\right)$

Answer: B

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102. If $y = e^{\log(\log x)}\log 3x$, then $\frac{dy}{dx}$

A. $\frac{3\log x + \log 3x}{x}$

B. $\frac{3\log x + \log 3x}{3x}$

C. $\frac{\log x + \log 3x}{x}$

D. $\frac{\log x + \log 3x}{3x}$

Answer: C

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103. If $y = \frac{e^x + 1}{e^x}, then \frac{dy}{dx} =$

A. $\frac{-1}{e^x}$

B. $\frac{1}{e^x}$

C. 0

D. e^x

Answer: A

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104. If $y = \frac{e^x + e^{-x}}{e^x - e^{-x}}, then \frac{dy}{dx} =$

A. $\frac{4e^{2x}}{\left(e^{2x} - 1\right)^2}$

B. $\frac{-4e^{2x}}{\left(e^{2x}-1\right)^2}$

C. $\frac{2e^{2x}}{\left(e^{2x}-1\right)^2}$

D. $\frac{-2e^{2x}}{\left(e^{2x}-1\right)^2}$

Answer: B

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105. If $y = \frac{e^{2x}-e^{-2x}}{e^{2x}+e^{-2x}}, then \frac{dy}{dx} =$

A. $\frac{4}{\left(e^{2x}+e^{-2x}\right)}$

B. $\frac{-4}{\left(e^{2x}+e^{-2x}\right)^2}$

C. $\frac{8}{\left(e^{2x}+e^{-2x}\right)^2}$

D. $\frac{-8}{\left(e^{2x}+e^{-2x}\right)^2}$

Answer: C

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106. If $y = \frac{e^{2x} - e^{-2x}}{e^{2x} + e^{-2x}}, then \frac{dy}{dx} =$

A. $2 - 2y^2$

B. $2 + 2y^2$

C. $2 - y^2$

D. $2 + y^2$

Answer: A

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107. $y = \frac{e^{\sqrt{x}+1}}{e^{\sqrt{x}-1}}, then \frac{dy}{dx} =$

A. $\dfrac{-e^{\sqrt{x}}}{\sqrt{x}\left(e^{\sqrt{x}-1}\right)^2}$

B. $\dfrac{e^{\sqrt{x}}}{\sqrt{x}\left(e^{\sqrt{x}-1}\right)^2}$

C. $\dfrac{-e^{\sqrt{x}}}{2\sqrt{x}\left(e^{\sqrt{x}-1}\right)^2}$

D. $\dfrac{-2e^{\sqrt{x}}}{\sqrt{x}\left(e^{\sqrt{x}-1}\right)^2}$

Answer: A

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108. If $y = \dfrac{a^{\cos x}}{\sqrt{1 + x^2}}, \textit{then} \dfrac{dy}{dx} =$

A. $\dfrac{a^{\cos x}\left(\left(1 + x^2\right)(\log a)(\sin a)(\sin x)\right)}{\left(\sqrt{1 + x^2}\right)^3}$

B. $\dfrac{-a^{\cos x}\left(\left(1 + x^2\right)(\log a)(\sin a)(\sin x)\right)}{\left(\sqrt{1 + x^2}\right)^3}$

C. $\dfrac{a^{\cos x}\left(\left(1+x^2\right)(\log a)(\sin a)(\sin x)+x\right)}{\left(\sqrt{1+x^2}\right)^3}$

D. $\dfrac{-a^{\cos x}\left(\left(1+x^2\right)(\log a)(\sin a)(\sin x)+x\right)}{\left(\sqrt{1+x^2}\right)^3}$

Answer: D

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109. $y=\log\left(3x^2+2x+1\right),\ find\dfrac{dy}{dx}$

A. $\dfrac{2(3x+1)}{3x^2+2x+1}$

B. $\dfrac{-2(3x+1)}{3x^2+2x+1}$

C. $\dfrac{3x+1}{3x^2+2x+1}$

D. $\dfrac{-(3x+1)}{3x^2+2x+1}$

Answer: A

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110. $\frac{d}{dx}(\log x)^4$ is equal to

A. $\frac{4(\log x)^3}{3x}$

B. $\frac{(4\log x)^3}{3x}$

C. $\frac{4(\log x)^3}{x}$

D. $\frac{(4\log x)^3}{3x}$

Answer: C

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111. If $y = (\log(\log(\log x)))^2, then \frac{dy}{dx} =$

A. $\frac{\log(\log(\log x))}{x\log(\log x)}$

B. $\frac{2\log(\log(\log x))}{x\log(\log x)}$

C. $\frac{\log(\log(\log x))}{x\log x\log(\log x)}$

D. $\frac{2\log(\log(\log x))}{x\log x\log(\log x)}$

Answer: D

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112. If $y = \log(\sec x + \tan x), then \frac{dy}{dx}$

A. $\sec x$

B. $\sec x\tan x$

C. $\tan x$

D. $\cos x$

Answer: A

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113. If $y = \log(\operatorname{cos}ecx - \cot x), then \frac{dy}{dx}$

A. $-\operatorname{cosec} x$

B. $\operatorname{cosec} x$

C. $-(\operatorname{cosec} x - \cot x)$

D. $\operatorname{cosec} x - \cot x$

Answer: B

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114. If $y = \log(\sin x + \cos x)$, then $\dfrac{dy}{dx}$

A. $\dfrac{x\sin x}{x\sin x + \cos x}$

B. $\dfrac{-x\sin x}{x\sin x + \cos x}$

C. $\dfrac{x\cos x}{x\sin x + \cos x}$

D. $\dfrac{-x\cos x}{x\sin x + \cos x}$

Answer: C

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115. If $y = \log(x\cos x - \sin x)$, *then* $\frac{dy}{dx}$

A. $\frac{x\cos x}{x\cos x - \sin x}$

B. $\frac{-x\cos x}{x\cos x - \sin x}$

C. $\frac{x\sin x}{x\cos x - \sin x}$

D. $\frac{-x\sin x}{x\cos x - \sin x}$

Answer: D

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116. $y = \log(x\tan x + \sec x)$, *then* $\frac{dy}{dx} =$

A. $\frac{x\sec^2 x + (1 + \sec x)\tan x}{x\tan x + \sec x}$

B. $\frac{x\sec^2 x - (1 + \sec x)\tan x}{x\tan x + \sec x}$

C. $\frac{x\sec^2 x + (1 - \sec x)\tan x}{x\tan x + \sec x}$

D. $\dfrac{x\sec^2 x + (1+\sec x)\tan x}{x\tan x + \sec x}$

Answer: A

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117. If $y = \log\sec e^{x^2}, then \cdot \dfrac{dy}{dx}$

A. $xe^{x^2}\tan e^{x^2}$

B. $2xe^{x^2}\tan e^{x^2}$

C. $-xe^{x^2}\tan e^{x^2}$

D. $-2xe^{x^2}\tan e^{x^2}$

Answer: B

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118. If $y = \log_{e^x}(\log x), then \dfrac{dy}{dx}$

A. $\frac{2}{x\log x}$

B. $\frac{-2}{x\log x}$

C. $\frac{1}{2x\log x}$

D. $\frac{-1}{2x\log x}$

Answer: C

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119. If $y = \log(\log(\log x))$, *then* $\frac{dy}{dx}$

A. $\frac{1}{x\log(\log x)}$

B. $\frac{\log x}{x\log(\log x)}$

C. $\frac{1}{x(\log x)\log(\log x)}$

D. $\frac{1}{(\log x)\log(\log x)}$

Answer: C

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120. If $y = \log_5\left(\log_7 x\right)$, $then \frac{dy}{dx} =$

A. $\frac{1}{x\log 5 \cdot \log_7 x}$

B. $\frac{1}{x\log 5 \cdot \log x}$

C. $\frac{1}{x\log 7 \cdot \log_5 x}$

D. $\frac{1}{x\log 7 \cdot \log x}$

Answer: B

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121. $f(x) = \log_x(\log x), then f'(x) at x = e is$

A. $\frac{1}{e}$

B. 1

C. e

D. $-e$

Answer: A

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122. If $y = \log x^x$, $then \frac{dy}{dx} =$

A. $\log(ex)$

B. $x^x(1 + \log x)$

C. $\log\left(\frac{e}{x}\right)$

D. $-\log\left(\frac{e}{x}\right)$

Answer: A

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123. If $y = (\log \sin x)(\log x)$, $then \frac{dy}{dx}$

A. $\frac{\log(\sin x)}{x} + (\log x)(\cot x)$

B. $\frac{\log(\sin x)}{x} - (\log x)(\cot x)$

C. $\frac{\log(\sin x)}{x} + (\log x)(\tan x)$

D. $\frac{\log(\sin x)}{x} - (\log x)(\tan x)$

Answer: A

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124. $y = \log\left(\frac{1 - \sin x}{1 + \sin x}\right)$, *then* $\frac{dy}{dx} =$

A. $-2\sec x$

B. $2\sec x$

C. $-2\tan x$

D. $2\tan x$

Answer: A

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125. If $y = \log\left(\frac{\cos x}{1 - \sin x}\right)$, then $\frac{dy}{dx}$ is equal to

A. $-\sec x$

B. $\sec x$

C. $-\cos ecx$

D. $\cos ecx$

Answer: B

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126. If $y = \log\left(\frac{\sin x}{1 + \cos x}\right)$, then $\frac{dy}{dx}$

A. $\sec x$

B. $-\sec x$

C. $\cos ecx$

D. $-\cos ecx$

Answer: C

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127. If $y = \log\left(\frac{1 - \cos x}{1 + \cos x}\right)$ thenn $\frac{dy}{dx} =$

A. $-\cos ecx$

B. $\cos ecx$

C. $-2\cos ecx$

D. $2\cos ecx$

Answer: D

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128. If $y = \log\sqrt{\dfrac{1-\cos\left(\frac{3x}{2}\right)}{1+\cos\left(\frac{3x}{2}\right)}}$, then $\dfrac{dy}{dx} =$

A. $\dfrac{-3}{2}\operatorname{cosec}\left(\dfrac{3x}{2}\right)$

B. $\dfrac{3}{2}\operatorname{cosec}\left(\dfrac{3x}{2}\right)$

C. $\dfrac{-3}{4}\operatorname{cosec}\left(\dfrac{3x}{4}\right)$

D. $\dfrac{3}{4}\operatorname{cosec}\left(\dfrac{3x}{4}\right)$

Answer: B

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129. $y = \log\left[\sin^3 x.\ \cos^4 x.\ \left(x^2-1\right)^5\right]$

A. $3\cot x + 4\tan x + \dfrac{2x}{x^2-1}$

B. $3\cot x - 4\tan x + \dfrac{2x}{x^2-1}$

C. $3\cot x + 4\tan x + \dfrac{10x}{x^2 - 1}$

D. $3\cot x - 4\tan x + \dfrac{10x}{x^2 - 1}$

Answer: D

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130. If $y = \log\left(\dfrac{e^x}{x^2}\right)$, then $\dfrac{dy}{dx} =$

A. $\dfrac{2 - x}{x}$

B. $\dfrac{x - 2}{x}$

C. $\dfrac{e - x}{xe}$

D. $\dfrac{x - e}{ex}$

Answer: B

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131. $y = \log\left[\frac{x + \sqrt{x^2 + 25}}{\sqrt{x^2 + 25} - x}\right]$, $find\frac{dy}{dx}$

A. 0

B. $\frac{1}{\sqrt{x^2 + 25}}$

C. $\frac{-1}{\sqrt{x^2 + 25}}$

D. $\frac{2}{\sqrt{x^2 + 25}}$

Answer: D

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132. If $y = \log\left(\frac{x + \sqrt{x^2 + a^2}}{-x + \sqrt{x^2 + a^2}}\right)$then $\frac{dy}{dx} =$

A. $\frac{2}{\sqrt{x^2 + a^2}}$

B. $\frac{-2}{\sqrt{x^2 + a^2}}$

C. $\dfrac{2x}{\sqrt{x^2+a^2}}$

D. $\dfrac{-2x}{\sqrt{x^2+a^2}}$

Answer: A

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133. $y = \log\left[e^{3x}\cdot\left(\dfrac{x-4}{x+3}\right)^{2/3}\right]$, find $\dfrac{dy}{dx}$

A. $3+\dfrac{2}{3(x-4)(x+3)}$

B. $3-\dfrac{2}{3(x-4)(x+3)}$

C. $3+\dfrac{14}{3(x-4)(x+3)}$

D. $3-\dfrac{14}{3(x-4)(x+3)}$

Answer: C

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134. If $y = \log\left(e^{4x}\left(\frac{x-5}{x+4}\right)^{\frac{5}{4}}\right)$ then $\frac{dy}{dx} =$

A. $4 + \frac{45}{4(x-5)(x+4)}$

B. $4 - \frac{45}{4(x-5)(x+4)}$

C. $4 + \frac{5}{4(x-5)(x+4)}$

D. $4 - \frac{5}{4(x-5)(x+4)}$

Answer: A

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135. $y = \log\left[a^{4x}.\left(\frac{x-5}{x+4}\right)^{\frac{3}{4}}\right]$

A. $4\log a + \frac{9}{4(x-5)(x+4)}$

B. $4\log a - \frac{9}{4(x-5)(x+4)}$

C. $4\log a + \dfrac{27}{4(x-5)(x+4)}$

D. $4\log a - \dfrac{27}{4(x-5)(x+4)}$

Answer: C

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136. If $y = \sin^{-1}\left(x^2 - 1\right)$ then $\dfrac{dy}{dx} =$

A. $\dfrac{2x}{\sqrt{2 - x^2}}$

B. $\dfrac{2}{\sqrt{2 - x^2}}$

C. $\dfrac{2x}{\sqrt{x^2 - 2}}$

D. $\dfrac{2}{\sqrt{x^2 - 2}}$

Answer: B

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137. If $y = \sin^{-1}\left(2^{x}\right)$, then $\frac{dy}{dx} =$

A. $\dfrac{-x}{2\sqrt{1-\left(1-x^{2}\right)^{2}}}$

B. $\dfrac{x}{2\sqrt{1-\left(1-x^{2}\right)^{2}}}$

C. $\dfrac{-2x}{2\sqrt{1-\left(1-x^{2}\right)^{2}}}$

D. $\dfrac{2x}{2\sqrt{1-\left(1-x^{2}\right)^{2}}}$

Answer: C

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138. If $y = \sin^{-1}\left(2^{x}\right)$, then $\frac{dy}{dx} =$

A. $\dfrac{2^{x}}{\sqrt{1-4^{x}}}$

B. $\dfrac{2^{x}\log 2}{\sqrt{1-4^{x}}}$

C. $\dfrac{2^{x}}{\sqrt{1-2^{x}}}$

D. $\dfrac{2^x \log 2}{\sqrt{1 - 2^x}}$

Answer: B

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139. If $y = \cos^{-1}\left(4\sqrt{x}\right)$, then $\dfrac{dy}{dx} =$

A. $\dfrac{-2}{\sqrt{x - 16x^2}}$

B. $\dfrac{-4}{\sqrt{x - 16x^2}}$

C. $\dfrac{-1}{2\sqrt{x - 16x^2}}$

D. $\dfrac{-1}{\sqrt{x - 16x^2}}$

Answer: A

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140. If $y = \cos^{-1}\left(\sqrt{\cos x}\right)$, then $\frac{dy}{dx} =$

A. $\frac{-\sin x}{\sqrt{\cos x(1-\cos x)}}$

B. $\frac{\sin x}{\sqrt{\cos x(1-\cos x)}}$

C. $\frac{-\sin x}{2\sqrt{\cos x(1-\cos x)}}$

D. $\frac{\sin x}{2\sqrt{\cos x(1-\cos x)}}$

Answer: C

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141. If $y = \cos^{-1}\left(\log_2 x\right)$, then $\frac{dy}{dx} =$

A. $\frac{-\log 2}{x\sqrt{(\log 2)^2 - (\log x)^2}}$

B. $\frac{\log 2}{x\sqrt{(\log 2)^2 - (\log x)^2}}$

C. $\frac{-1}{x\sqrt{(\log 2)^2 - (\log x)^2}}$

D. $\dfrac{1}{x\sqrt{(\log 2)^2 - (\log x)^2}}$

Answer: D

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142. If $y = \tan^{-1}\left(3x^2 + 2\right)$, then $\dfrac{dy}{dx} =$

A. $\dfrac{-3x}{9x^4 + 12x^2 + 5}$

B. $\dfrac{3x}{9x^4 + 12x^2 + 5}$

C. $\dfrac{-6x}{9x^4 + 12x^2 + 5}$

D. $\dfrac{6x}{9x^4 + 12x^2 + 5}$

Answer: D

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143. At $x = 0$, if $\dfrac{d}{dx}\left(\tan^{-1}(a + bx)\right) = 1$, then $a^6 - b^3 + 1 =$

A. $-3a^2b$

B. $3a^2b$

C. $-3ab^2$

D. $-3ab^2$

Answer: A

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144. If $y = \cot^{-1}\left(\frac{1}{\sqrt{x}}\right)$, then $\frac{dy}{dx} =$

A. $\frac{-1}{\sqrt{x}(1+x)}$

B. $\frac{1}{\sqrt{x}(1+x)}$

C. $\frac{-1}{2\sqrt{x}(1+x)}$

D. $\frac{1}{2\sqrt{x}(1+x)}$

Answer: D

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145. If $y = \operatorname{cosec}^{-1}(2x+1)$, then $\frac{dy}{dx} =$

A. $\dfrac{2\left(\tan^{-1}x\right)^{\frac{2}{3}}}{3\left(1+x^2\right)}$

B. $\dfrac{4\left(\tan^{-1}x\right)^{\frac{2}{3}}}{3\left(1+x^2\right)}$

C. $\dfrac{4\left(\tan^{-1}x\right)^{\frac{4}{3}}}{3\left(1+x^2\right)}$

D. $\dfrac{4\left(\tan^{-1}x\right)^{\frac{1}{3}}}{3\left(1+x^2\right)}$

Answer: C

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146. If $y = \left(\tan^{-1}x\right)^{\frac{4}{3}}$, then $\frac{dy}{dx} =$

A. $\dfrac{2\left(\tan^{-1}x\right)^{\frac{2}{3}}}{3\left(1+x^2\right)}$

B. $\dfrac{4\left(\tan^{-1}x\right)^{\frac{2}{3}}}{3\left(1+x^2\right)}$

C. $\dfrac{4\left(\tan^{-1}x\right)^{\frac{4}{3}}}{3\left(1+x^2\right)}$

D. $\dfrac{4\left(\tan^{-1}x\right)^{\frac{1}{3}}}{3\left(1+x^2\right)}$

Answer: D

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147. If $y=\sin\left(2\cos^{-1}x\right)$, then $\dfrac{dy}{dx}=$

A. $\dfrac{2\cos\left(2\cos^{-1}x\right)}{\sqrt{1-x^2}}$

B. $\dfrac{-2\cos\left(2\cos^{-1}x\right)}{\sqrt{1-x^2}}$

C. $\dfrac{\cos\left(2\cos^{-1}x\right)}{2\sqrt{1-x^2}}$

D. $\dfrac{-\cos\left(2\cos^{-1}x\right)}{2\sqrt{1-x^2}}$

Answer: B

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148. If $y = \operatorname{cosec}\left(3\tan^{-1}x\right)$, then $\dfrac{dy}{dx} =$

A. $\dfrac{3\operatorname{cosec}\left(3\tan^{-1}x\right)\cot\left(3\tan^{-1}x\right)}{1+x^2}$

B. $\dfrac{-3\operatorname{cosec}\left(3\tan^{-1}x\right)\cot\left(3\tan^{-1}x\right)}{1+x^2}$

C. $\dfrac{\operatorname{cosec}\left(3\tan^{-1}x\right)\cot\left(3\tan^{-1}x\right)}{1+x^2}$

D. $\dfrac{-\operatorname{cosec}\left(3\tan^{-1}x\right)\cot\left(3\tan^{-1}x\right)}{1+x^2}$

Answer: B

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149. $\frac{d}{dx}\left(\cos\left(\sec^{-1}\left(\frac{x}{8}\right)\right)\right) =$

A. $\frac{8}{x^2}$

B. $\frac{-8}{x^2}$

C. $\frac{1}{8}$

D. $\frac{-1}{8}$

Answer: B

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150. If $y = \sin^{-1}(\cos 3x)$, then $\frac{dy}{dx} =$

A. 3

B. -3

C. $\frac{3}{\sqrt{1-x^2}}$

D. $\frac{-3}{\sqrt{1-x^2}}$

Answer: B

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151. If $y = \cos^{-1}(\cos x)$, then $\frac{dy}{dx}$ is

A. 1 and the 2^{nd} and 3^{rd} quadrants of the plane

B. -1 and the 3^{rd} and 4^{th} quadrants of the plane

C. 1 in the whole plane

D. -1 in the whole plane I152

Answer: C

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152. If $y = \cos^{-1}\left(\sin x^2\right)$, then $\frac{dy}{dx} =$

A. -2

B. 2

C. $-2x$

D. 2x

Answer: C

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153. If $y = \sin^{-1}x + \cos^{-1}x$, then $\frac{dy}{dx} =$

A. $\frac{\pi}{2}$

B. $\frac{\pi x}{2}$

C. 0

D. π

Answer: A

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154. If $y = \operatorname{cosec}^{-1}\left(\frac{x^2+1}{x^2-1}\right) + \cos^{-1}\left(\frac{x^2-1}{x^2+1}\right)$, then $\frac{dy}{dx} =$

A. 0

B. 1

C. $\frac{1}{\sqrt{1-x^2}}$

D. $\frac{-1}{\sqrt{1-x^2}}$

Answer: A

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155. If $y = \sec^{-1}\left(\frac{\sqrt{x}-1}{x+\sqrt{x}}\right) + \sin^{-1}\left(\frac{x+\sqrt{x}}{\sqrt{x}-1}\right)$, then $\frac{dy}{dx} =$

A. x

B. $\frac{1}{x}$

C. 1

D. 0

Answer: D

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156. If $y = \tan^{-1}\sqrt{x^2 + y^2} + \cot^{-1}\sqrt{x^2 + y^2}$, then $\frac{dy}{dx} =$

A. $\frac{\pi}{2}$

B. $\frac{2}{\pi}$

C. 0

D. 1

Answer: C

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157. If $xy = \tan^{-1}(xy) + \cot^{-1}(xy)$, then $\frac{dy}{dx}$ is equal to

A. 0

B. 1

C. $\frac{-x}{y}$

D. $\frac{-y}{x}$

Answer: A

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158. If $y = \tan^{-1}(1+2x) + \tan^{-1}(1-2x)$, then $\frac{dy}{dx} =$

A. $\frac{-4x}{1+4x^4}$

B. $\frac{4x}{1+4x^4}$

C. $\frac{-2x}{1+4x^4}$

D. $\dfrac{2x}{1+4x^4}$

Answer: D

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159. If $y = 10^{\cot^{-1}} + 10^{\tan^{-1}}$, then $\dfrac{dy}{dx} =$

A. $\dfrac{\log 100}{1+x^2}\left(10^{\cot^{-1}} - 10^{\tan^{-1}x}\right)$

B. $\dfrac{\log 100}{1+x^2}\left(10^{\tan^{-1}x} - 10^{\cot^{-1}x}\right)$

C. $\dfrac{\log 10}{1+x^2}\left(10^{\cot^{-1}} - 10^{\tan^{-1}x}\right)$

D. $\dfrac{\log 10}{1+x^2}\left(10^{\tan^{-1}x} - 10^{\cot^{-1}x}\right)$

Answer: D

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160. If $y = \sqrt{x}\operatorname{cosec}^{-1}\left(\dfrac{1}{4x}\right)$, then $\dfrac{dy}{dx} =$

A. $\dfrac{\sin^{-1}4x}{2\sqrt{x}}+\dfrac{4\sqrt{x}}{\sqrt{1-16x^2}}$

B. $\dfrac{\sin^{-1}4x}{2\sqrt{x}}+\dfrac{2\sqrt{x}}{\sqrt{1-16x^2}}$

C. $\dfrac{\sin^{-1}4x}{2\sqrt{x}}-\dfrac{4\sqrt{x}}{\sqrt{1-16x^2}}$

D. $\dfrac{\sin^{-1}4x}{2\sqrt{x}}-\dfrac{2\sqrt{x}}{\sqrt{1-16x^2}}$

Answer: A

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161. If $y=e^{2x}\tan^{-1}2x$, then $\dfrac{dy}{dx}=$

A. $2e^{2x}\left(\tan^{-1}2x+\dfrac{1}{1+4x^2}\right)$

B. $e^{2x}\left(\tan^{-1}2x+\dfrac{1}{1+4x^2}\right)$

C. $2e^{2x}\left(\tan^{-1}2x+\dfrac{2}{1+4x^2}\right)$

D. $2e^{2x}\left(\tan^{-1}2x+\frac{1}{1+4x^2}\right)$

Answer: A

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162. If $y=5^x\sec^{-1}x$, then $\frac{dy}{dx}=$

A. $5^x\left((\log 5)\sec^{-1}2x+\frac{1}{x\sqrt{4x^2-1}}\right)$

B. $5^x\left((\log 5)\sec^{-1}2x+\frac{2}{x\sqrt{4x^2-1}}\right)$

C. $5^x\left((\log 5)\sec^{-1}2x+\frac{1}{2x\sqrt{4x^2-1}}\right)$

D. $5^x\left((\log 5)\sec^{-1}2x+\frac{1}{x\sqrt{4x^2-1}}\right)$

Answer: C

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163. If $f(x) = x\tan^{-1}x$, then $\frac{dy}{dx} =$

A. 2

B. $1 + \frac{\pi}{4}$

C. $\frac{1}{2} + \frac{\pi}{4}$

D. $\frac{1}{2} - \frac{\pi}{4}$

Answer: A

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164. If $y = \frac{\sin^{-1}x}{\sqrt{1 - x^2}}$, *then* $\frac{\left(1 - x^2\right)dy}{dx}$ is equal to $x + y$ (b) $1 + xy$ $1 - xy$ (d) $xy - 2$

A. $1 + xy$

B. $1 - xy$

C. $x + y$

D. $xy - 2$

Answer: C

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165. If $y = \dfrac{\cos^{-1}x}{1 + x^2}$, then $\dfrac{dy}{dx} =$

A. $\dfrac{x^2 + 1 - x\sqrt{1 - x^2}\cos^{-1}x}{\left(x^2 + 1\right)^2\sqrt{1 - x^2}}$

B. $\dfrac{x^2 + 1 + x\sqrt{1 - x^2}\cos^{-1}x}{\left(x^2 + 1\right)^2\sqrt{1 - x^2}}$

C. $-\left(\dfrac{x^2 + 1 + x\sqrt{1 - x^2}\cos^{-1}x}{\left(x^2 + 1\right)^2\sqrt{1 - x^2}}\right)$

D. $-\left(\dfrac{x^2 + 1 - 2x\sqrt{1 - x^2}\cos^{-1}x}{\left(x^2 + 1\right)^2\sqrt{1 - x^2}}\right)$

Answer: C

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166. If $y = \sin^{-1}\left(2\cos^2 x - 1\right)$, then $\frac{dy}{dx} =$

A. 1

B. -1

C. 2

D. -2

Answer: D

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167. If $y = \cos^{-1}\left(1 - 2\sin^2 x\right)$, then $\frac{dy}{dx} =$

A. 2

B. -2

C. 1

D. -1

Answer: A

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168. If $y = \cos^{-1}\sqrt{(1+\cos x)/(2)}$, then $\frac{dy}{dx} =$

A. $\frac{1}{2}$

B. $\frac{-1}{2}$

C. 1

D. -1

Answer: A

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169. If $y = \tan^{-1}\left(\frac{1 - \cos x}{\sin x}\right)$ then $\frac{dy}{dx} = ?$

A. 2

B. -2

C. $\frac{1}{2}$

D. $\frac{-1}{2}$

Answer: C

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170. If $y = \tan^{-1}\left(\frac{\sin x}{1 - \cos x}\right)$, then $\frac{dy}{dx} =$

A. -1

B. 1

C. $\frac{-1}{2}$

D. $\frac{1}{2}$

Answer: C

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171. if $y = \tan^{-1}\left(\frac{\sin x}{1 + \cos x}\right)$ prove that $\frac{dy}{dx} = \frac{1}{2}$

A. $\frac{-1}{2}$

B. $\frac{1}{2}$

C. -2

D. 2

Answer: B

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172. If $y = \tan^{-1}\left(\frac{\cos x}{1 + \sin x}\right)$, then $\frac{dy}{dx}$ is equal to

A. -1

B. 1

C. $\frac{-1}{2}$

D. $\frac{1}{2}$

Answer: C

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173. If $y = \tan^{-1}\left(\frac{1 - \sin x}{\cos x}\right)$, then $\frac{dy}{dx} =$

A. 2

B. -2

C. $\frac{1}{2}$

D. $\frac{-1}{2}$

Answer: D

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174. If $y = \tan^{-1}\left(\frac{\cos x}{1 - \sin x}\right)$, then $\frac{dy}{dx} =$

A. $\frac{-3}{2}$

B. $\frac{3}{2}$

C. $\frac{-1}{2}$

D. $\frac{1}{2}$

Answer: D

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175. If $y = \tan^{-1}\sqrt{\frac{1 - \cos x}{1 + \cos x}}$, prove that $\frac{dy}{dx} = \frac{1}{2}$.

A. $\frac{1}{2}$

B. $\frac{-1}{2}$

C. 2

D. -2

Answer: A

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176. If $y = \tan^{-1}\sqrt{\dfrac{1 + \cos\left(\frac{x}{2}\right)}{1 - \cos\left(\frac{x}{2}\right)}}$, then $\dfrac{dy}{dx} =$

A. $\dfrac{1}{2}$

B. $\dfrac{-1}{2}$

C. $\dfrac{1}{4}$

D. $\dfrac{-1}{4}$

Answer: D

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177. If $y = \tan^{-1}(\text{cosec x} - \cot x)$, then $\dfrac{dy}{dx} =$

A. 1

B. -1

C. $\frac{1}{2}$

D. $\frac{-1}{2}$

Answer: C

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178. If $y = \tan^{-1}(\sec x + \tan x)$ then $\frac{dy}{dx} = ?$

A. -1

B. 1

C. $\frac{-1}{2}$

D. $\frac{1}{2}$

Answer: D

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179. If $y = \cot^{-1}(\text{cosec x} + \cot x)$, then $\dfrac{dy}{dx} =$

A. -1

B. 1

C. $\dfrac{-1}{2}$

D. $\dfrac{1}{2}$

Answer: D

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180. If $y = \tan^{-1}(\sec x + \tan x)$ then $\dfrac{dy}{dx} = ?$

A. $\dfrac{-\cos x}{1 + \sin^2 x}$

B. $\dfrac{\cos x}{1 + \sin x}$

C. $\dfrac{-\sin x}{1 + \cos^2 x}$

D. $\dfrac{\sin x}{1+\cos^2 x}$

Answer: B

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181. If $y = \tan^{-1}\sqrt{\dfrac{1-\sin 4x}{1+\sin 4x}}$, then $\dfrac{dy}{dx} =$

A. 2

B. -2

C. 4

D. -4

Answer: B

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182. If $y = \dfrac{\tan^{-1}\left(\sqrt{1 + \sin x} + \sqrt{1 - \sin x}\right)}{\sqrt{1 + \sin x} - \sqrt{1 - \sin x}}$ find the value of $\dfrac{dy}{dx}$

A. $\dfrac{-1}{2}$

B. $\dfrac{1}{2}$

C. -1

D. 1

Answer: A

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183. If $y = \tan^{-1}\left(\dfrac{\sin x + \cos x}{\cos x - \sin x}\right)$, then $\dfrac{dy}{dx}$ is equal to $\dfrac{1}{2}$ (b) 0 (c) 1 (d) none of these

A. -1

B. 1

C. $\dfrac{-1}{2}$

D. $\frac{1}{2}$

Answer: B

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184. If $y = \sin^{-1}\left(\frac{\cos x + \sin x}{\sqrt{2}}\right)$, $then \frac{dy}{dx} =$

A. -1

B. 1

C. $-\sqrt{2}$

D. $\sqrt{2}$

Answer: B

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185. If $y = \sin^{-1}\left(\frac{a\sin x + b\cos x}{\sqrt{a^2 + b^2}}\right)$, then $\frac{dy}{dx} =$

A. a

B. b

C. -1

D. 1

Answer: D

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186. If $y = \sin^{-1}\left(\frac{4\cos x + 5\sin x}{\sqrt{41}}\right)$, then $\frac{dy}{dx} =$

A. -1

B. -2

C. 0

D. 1

Answer: D

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187. If $y=\cos^{-1}\left(\frac{\cos x+\sin x}{\sqrt{2}}\right), then \frac{dy}{dx}=$

A. 2

B. -2

C. 0

D. -1

Answer: D

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188. If $y = \cos^{-1}\left(\frac{\sqrt{3}\cos x + \sin x}{2}\right)$, *then* $\frac{dy}{dx} =$

A. -1

B. 2

C. $-\sqrt{3}$

D. $\sqrt{3}$

Answer: A

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189. If $y = \cos^{-1}\left(\frac{3\cos x - 2\sin x}{\sqrt{13}}\right)$, *then* $\frac{dy}{dx} =$

A. 3

B. -2

C. 1

D. 0

Answer: C

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190. If $y = \cos^{-1}\left(\frac{3\sin x + 4\cos x}{5}\right), then \frac{dy}{dx} =$

A. $\frac{3}{5}$

B. $\frac{4}{5}$

C. -1

D. 0

Answer: C

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191. If $y = \cos^{-1}\left(\frac{3\cos x - 4\sin x}{5}\right), then \frac{dy}{dx} =$

A. 1

B. 0

C. 3

D. -4

Answer: A

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192. If $y = \sin^{-1}\sqrt{1 - x^2}$, $then \frac{dy}{dx} =$

A. $\frac{1}{\sqrt{1 + x^2}}$

B. $\frac{-1}{\sqrt{x^2 - 1}}$

C. $\frac{1}{\sqrt{1 - x^2}}$

D. $\frac{-1}{\sqrt{1 - x^2}}$

Answer: D

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193. If $y = \sin^{-1}\left(2x\sqrt{1-x^2}\right)$, then $\frac{dy}{dx} =$

A. $\frac{1}{\sqrt{1-x^2}}$

B. $\frac{-1}{\sqrt{1-x^2}}$

C. $\frac{2}{\sqrt{1-x^2}}$

D. $\frac{-2}{\sqrt{1-x^2}}$

Answer: C

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194. $y = \sin^{-1}\left(1-2x^2\right)$, then $\frac{dy}{dx} =$

A. $\frac{1}{\sqrt{1-x^2}}$

B. $\frac{-1}{\sqrt{1-x^2}}$

C. $\frac{2}{\sqrt{1-x^2}}$

D. $\frac{-2}{\sqrt{1-x^2}}$

Answer: D

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195. If $y = \sin^{-1}\left(2x^2 - 1\right),\ then\frac{dy}{dx} =$

A. $\frac{2}{\sqrt{1-x^2}}$

B. $\frac{-2}{\sqrt{1-x^2}}$

C. $\frac{1}{\sqrt{1-x^2}}$

D. $\frac{-1}{\sqrt{1-x^2}}$

Answer: A

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196. If $y = \sin^{-1}\left(4x^3 - 3x\right), then \frac{dy}{dx} =$

A. $\frac{-3}{\sqrt{1 - x^2}}$

B. $\frac{3}{\sqrt{1 - x^2}}$

C. $\frac{-1}{\sqrt{1 - x^2}}$

D. $\frac{1}{\sqrt{1 - x^2}}$

Answer: B

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197. If $y = \sin^{-1}\left(3x - 4x^3\right)$ then $\frac{dy}{dx} = ?$

A. $\frac{-3}{\sqrt{1 - x^2}}$

B. $\frac{3}{\sqrt{1 - x^2}}$

C. $\frac{-1}{\sqrt{1 - x^2}}$

D. $\frac{1}{\sqrt{1 - x^2}}$

Answer: B

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198. If $y = \sin^{-1}\left(\frac{2x}{1 + x^2}\right)$, then $\frac{dy}{dx}$ is equal to

A. $\frac{-2}{1 + x^2}$

B. $\frac{2}{1 + x^2}$

C. $\frac{-1}{1 + x^2}$

D. $\frac{1}{1 + x^2}$

Answer: B

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199. If $y = \sin^{-1}\left(\frac{2^{x+1}}{1+4^x}\right)$, *then* $\frac{dy}{dx} =$

A. $\frac{-2^x \log 2}{1+4^x}$

B. $\frac{2^x \log 2}{1+4^x}$

C. $\frac{-2^{x+1} \log 2}{1+4^x}$

D. $\frac{2^{x+1} \log 2}{1+4^x}$

Answer: D

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200. $\sin^{-1}\left(\frac{1-25x^2}{1+25x^2}\right)$ differentiate

A. $\frac{10}{1+25x^2}$

B. $\frac{-10}{1+25x^2}$

C. $\frac{2}{1+25x^2}$

D. $\frac{-2}{1+25x^2}$

Answer: B

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201. If $y = \sin^{-1}\sqrt{\frac{1+x^2}{2}}$, $then \frac{dy}{dx} =$

A. $\frac{-x}{\sqrt{1-x^4}}$

B. $\frac{x}{\sqrt{1-x^4}}$

C. $\frac{-2x}{\sqrt{1-x^4}}$

D. $\frac{2x}{\sqrt{1-x^4}}$

Answer: B

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202. If $y = \sin^{-1}\left(\frac{x}{\sqrt{x^2 + a^2}}\right)$, then $\frac{dy}{dx} =$

A. $\frac{-a^2}{a^2 + x^2}$

B. $\frac{a^2}{a^2 + x^2}$

C. $\frac{-a}{a^2 + x^2}$

D. $\frac{a}{a^2 + x^2}$

Answer: D

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203. If $y = \sin^{-1}\left(x\cos a + \sqrt{1 - x^2}\sin\alpha\right)$, then $\frac{dy}{dx} =$

A. $\frac{1}{\sqrt{1 - x^2}}$

B. $\frac{-1}{\sqrt{1 - x^2}}$

C. $\frac{2}{\sqrt{1 - x^2}}$

D. $\dfrac{-2}{\sqrt{1-x^2}}$

Answer: A

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204. If $y=\sin^{-1}\left(x\sqrt{1-x}+\sqrt{x}\sqrt{1-x^2}\right)$, *then* $\dfrac{dy}{dx}=$

A. $\dfrac{-2x}{\sqrt{1-x^2}}+\dfrac{1}{2\sqrt{x-x^2}}$

B. $\dfrac{-1x}{\sqrt{1-x^2}}+\dfrac{1}{2\sqrt{x-x^2}}$

C. $\dfrac{1x}{\sqrt{1-x^2}}+\dfrac{1}{2\sqrt{x-x^2}}$

D. $\dfrac{1x}{\sqrt{1-x^2}}-\dfrac{1}{2\sqrt{x-x^2}}$

Answer: C

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205. यदि $y = \sin^{-1}\left\{\frac{5x + 12\sqrt{1 - x^2}}{13}\right\}$ तब $\frac{dy}{dx}$ का मान ज्ञात कीजिए|

A. $\frac{1}{\sqrt{1 - x^2}}$

B. $\frac{-1}{\sqrt{1 - x^2}}$

C. $\frac{2}{\sqrt{1 - x^2}}$

D. $\frac{-2}{\sqrt{1 - x^2}}$

Answer: A

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206. if $y = \sin^{-1}\left(\frac{\sqrt{1 + x} + \sqrt{1 - x}}{2}\right)$ then $\frac{dy}{dx}$

A. $\frac{-2}{\sqrt{1 - x^2}}$

B. $\frac{2}{\sqrt{1 - x^2}}$

C. $\dfrac{-1}{\sqrt{1 - x^2}}$

D. $\dfrac{1}{\sqrt{1 - x^2}}$

Answer: C

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207. If $y = \sin^{-1}\left(\dfrac{3x + 4\sqrt{1 - x^2}}{5}\right), then \dfrac{dy}{dx} =$

A. $\dfrac{-1}{\sqrt{1 - x^2}}$

B. $\dfrac{1}{\sqrt{1 - x^2}}$

C. $\dfrac{-2}{\sqrt{1 - x^2}}$

D. $\dfrac{2}{\sqrt{1 - x^2}}$

Answer: B

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208. If

$$y = \left\{(\log)_{\cos x}\sin x\right\}\left\{(\log)_{\sin x}\cos x\right\}^{-1} + \sin^{-1}\left(\frac{2x}{1+x^2}\right), f \in d\frac{dy}{dx} at x = \frac{\pi}{4}$$

A. 0

B. 1

C. $\dfrac{8}{4+\pi^2}$

D. $\dfrac{-8}{4+\pi^2}$

Answer: C

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209. If $y = \sin\left[2\tan^{-1}\left\{\sqrt{\frac{1-x}{1+x}}\right\}\right], f \in d\frac{dy}{dx}$

A. $\dfrac{-x}{\sqrt{1-x^2}}$

B. $\dfrac{x}{\sqrt{1-x^2}}$

C. $\dfrac{-2x}{\sqrt{1-x^2}}$

D. $\dfrac{2x}{\sqrt{1-x^2}}$

Answer: A

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210. If $y = \sin^2\left(\cot^{-1}\sqrt{\dfrac{1+x}{1-x}}\right)$ then $\dfrac{dy}{dx}$ is

A. $\dfrac{-1}{2}$

B. $\dfrac{1}{2}$

C. -2

D. 2

Answer: A

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211. If $y = \cos^{-1}\sqrt{1 - x}$, then $\frac{dy}{dx} =$

A. $\frac{-1}{2\sqrt{x - x^2}}$

B. $\frac{1}{2\sqrt{x - x^2}}$

C. $\frac{-2}{2\sqrt{x - x^2}}$

D. $\frac{2}{2\sqrt{x - x^2}}$

Answer: B

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212. If $y = \cos^{-1}\left(\frac{\log x^2}{1 + (\log x)^2}\right)$, then $\frac{dy}{dx} =$

A. $\frac{-2}{x\left(1 + (\log x)^2\right)}$

B. $\frac{2}{x\left(1 + (\log x)^2\right)}$

C. $\frac{-1}{x\left(1+(\log x)^2\right)}$

D. $\frac{1}{x\left(1+(\log x)^2\right)}$

Answer: A

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213. If $y=\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)$, *then* $\frac{dy}{dx}=$

A. $\frac{1}{1+x^2}$

B. $\frac{-1}{1+x^2}$

C. $\frac{2}{1+x^2}$

D. $\frac{-2}{1+x^2}$

Answer: C

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214. If $f(x) = \cos^{-1}\left[\frac{1 - (\log x)^2}{1 + (\log x)^2}\right]$, then the value of $f'(e)$ is equal to........

A. 1

B. $\frac{2}{e^2}$

C. $\frac{2}{e}$

D. $\frac{1}{e}$

Answer: D

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215. If $y = \cos^{-1}\left(\frac{x - x^{-1}}{x + x^{-1}}\right)$, *then* $\frac{dy}{dx} =$

A. $\frac{1}{1 + x^2}$

B. $\frac{-1}{1 + x^2}$

C. $\frac{2}{1 + x^2}$

D. $\frac{-2}{1+x^2}$

Answer: D

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216. If $y = \cos^{-1}\left(\frac{x^{-1}-x}{x^{-1}+x}\right)$, *then* $\frac{dy}{dx} =$

A. $\frac{1}{1+x^2}$

B. $\frac{-1}{1+x^2}$

C. $\frac{2}{1+x^2}$

D. $\frac{-2}{1+x^2}$

Answer: C

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217. If $y = \cos^{-1}\left(\frac{a^{-x} - a^{x}}{a^{-x} + a^{x}}\right)$, then $\frac{dy}{dx} =$

A. $\frac{-a^{x}\log a}{1 + a^{2x}}$

B. $\frac{a^{x}\log a}{1 + a^{2x}}$

C. $\frac{-2a^{x}\log a}{1 + a^{2x}}$

D. $\frac{2a^{x}\log a}{1 + a^{2x}}$

Answer: D

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218. If $y = \cos^{-1}\sqrt{\frac{1 + x}{2}}$ then $\frac{dy}{dx} =$

A. $\frac{-1}{2\sqrt{1 - x^{2}}}$

B. $\frac{1}{2\sqrt{1 - x^{2}}}$

C. $\frac{-2}{2\sqrt{1 - x^{2}}}$

D. $\dfrac{2}{2\sqrt{1-x^2}}$

Answer: A

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219. If $y=\cos^{-1}\left(x\sin\alpha-\cos\alpha\sqrt{1-x^2}\right)$, then $\dfrac{dy}{dx}=$

A. $\dfrac{-2}{\sqrt{1-x^2}}$

B. $\dfrac{2}{\sqrt{1-x^2}}$

C. $\dfrac{-1}{\sqrt{1-x^2}}$

D. $\dfrac{1}{\sqrt{1-x^2}}$

Answer: C

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220. If $y = \cos^{-1}\left(\frac{\sqrt{1+x} - \sqrt{1-x}}{2}\right)$, *then* $\frac{dy}{dx} =$

A. $\frac{1}{2\sqrt{1-x^2}}$

B. $\frac{-1}{2\sqrt{1-x^2}}$

C. $\frac{2}{2\sqrt{1-x^2}}$

D. $\frac{-2}{2\sqrt{1-x^2}}$

Answer: B

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221. Find $\frac{dy}{dx}$ for the function: $y = \sin^{-1}\sqrt{(1-x)} + \cos^{-1}\sqrt{x}$

A. $\frac{1}{\sqrt{x+x^2}}$

B. $\frac{-1}{\sqrt{x+x^2}}$

C. $\frac{2}{\sqrt{x+x^2}}$

D. $\dfrac{-2}{\sqrt{x+x^2}}$

Answer: C

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222. If $y = \cos^{-1}\left(\dfrac{2x}{1+x^2}\right)$, then $\dfrac{dy}{dx}$ is equal to

A. $\dfrac{1}{\sqrt{x}(1+x)}$

B. $\dfrac{-1}{\sqrt{x}(1+x)}$

C. $\dfrac{2}{\sqrt{x}(1+x)}$

D. $\dfrac{-2}{\sqrt{x}(1+x)}$

Answer: B

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223. If $y = \cos^{-1}\left(\frac{2x}{1+x^2}\right)$, then $\frac{dy}{dx}$ is equal to

A. $\frac{2}{1+x^2}$

B. $\frac{-2}{1+x^2}$

C. $\frac{1}{1+x^2}$

D. $\frac{-1}{1+x^2}$

Answer: B

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224. $\sec^{-1}\left(\frac{1+e^{2\sqrt{x}}}{2e^{\sqrt{x}}}\right)$ differentiate

A. $\frac{-e^{\sqrt{x}}}{\sqrt{x}\left(1+e^{2\sqrt{x}}\right)}$

B. $\frac{e^{\sqrt{x}}}{\sqrt{x}\left(1+e^{2\sqrt{x}}\right)}$

C. $\dfrac{-2e^{\sqrt{x}}}{\sqrt{x}\left(1+e^{2\sqrt{x}}\right)}$

D. $\dfrac{2e^{\sqrt{x}}}{\sqrt{x}\left(1+e^{2\sqrt{x}}\right)}$

Answer: A

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225. If $y = \cos^{-1}\sqrt{1+x^2}, then \dfrac{dy}{dx} =$

A. $\dfrac{-2}{1+x^2}$

B. $\dfrac{2}{1+x^2}$

C. $\dfrac{-1}{1+x^2}$

D. $\dfrac{1}{1+x^2}$

Answer: C

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226. If $y = \cos^{-1}\left(\frac{1}{3x - 4x^3}\right)$, *then* $\frac{dy}{dx}$

A. $\frac{-1}{\sqrt{1 - x^2}}$

B. $\frac{2}{\sqrt{1 - x^2}}$

C. $\frac{-1}{\sqrt{1 - x^2}}$

D. $\frac{1}{\sqrt{1 - x^2}}$

Answer: D

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227. if $y = \tan^{-1}\left(\frac{x}{\sqrt{1 + x^2}}\right)$ then find $\frac{dy}{dx}$

A. $\frac{1}{\sqrt{1 - x^2}}$

B. $\frac{-1}{\sqrt{1 - x^2}}$

C. $\dfrac{x}{\sqrt{1-x^2}}$

D. $\dfrac{\sqrt{1-x^2}}{x}$

Answer: A

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228. If $y = \tan^{-1}\left(\dfrac{2^{x+1}}{1-4^x}\right)$, $then \dfrac{dy}{dx} =$

A. $\dfrac{2^x \log 2}{1+4^x}$

B. $\dfrac{-2^x \log 2}{1+4^x}$

C. $\dfrac{2^{x+1} \log 2}{1+4^x}$

D. $\dfrac{-2^{x+1} \log 2}{1+4^x}$

Answer: C

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229. If `y=tan^(-1)((3x-x^3)/(1-3x^2)),1/(sqrt(3))

A. $\frac{3}{1+x^2}$

B. $\frac{-3}{1+x^2}$

C. $\frac{1}{1+x^2}$

D. $\frac{-1}{1+x^2}$

Answer: A

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230. If $y = \frac{3a^2x - x^3}{a^3 - 3ax^2}$ then find $\frac{dy}{dx}$

A. $\frac{-3a}{a^2+x^2}$

B. $\frac{3a}{a^2+x^2}$

C. $\frac{-3a^2}{a^2+x^2}$

D. $\frac{3a^2}{a^2+x^2}$

Answer: B

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231. If $y = \tan n^{-1}\left(\frac{\sqrt{x}(3 - x)}{1 - 3x}\right), then \frac{dy}{dx} =$

A. $\frac{-3}{\sqrt{x}(1 + x)}$

B. $\frac{3}{\sqrt{x}(1 + x)}$

C. $\frac{-3}{2\sqrt{x}(1 + x)}$

D. $\frac{3}{2\sqrt{x}(1 + x)}$

Answer: D

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232. If $y = \tan^{-1}\sqrt{\frac{1 - x}{1 + _x}}$, then find $\frac{dy}{dx}$ when $-1 < x < 1$.

A. $\frac{-2}{\sqrt{1-x^2}}$

B. $\frac{2}{\sqrt{1-x^2}}$

C. $\frac{-1}{\sqrt{1-x^2}}$

D. $\frac{1}{\sqrt{1-x^2}}$

Answer: C

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233. If $y=\tan^{-1}\sqrt{\frac{a-x}{a+x}}$, then $\frac{dy}{dx}=$

A. $\frac{-1}{2\sqrt{a^2-x^2}}$

B. $\frac{1}{2\sqrt{a^2-x^2}}$

C. $\frac{-1}{\sqrt{a^2-x^2}}$

D. $\frac{1}{\sqrt{a^2-x^2}}$

Answer: A

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234. If $y = \tan^{-1}\left(\sqrt{1+x^2}+x\right)$, $then\frac{dy}{dx} =$

A. $\frac{-1}{2\left(1+x^2\right)}$

B. $\frac{1}{2\left(1+x^2\right)}$

C. $\frac{-2}{2\left(1+x^2\right)}$

D. $\frac{2}{2\left(1+x^2\right)}$

Answer: A

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235. If $y = \tan^{-1}\left(\sqrt{1+x^2}-x\right)$, $then\frac{dy}{dx} =$

A. $\frac{-1}{2\left(1+x^2\right)}$

B. $\frac{1}{2\left(1+x^2\right)}$

C. $\frac{-2}{2\left(1+x^2\right)}$

D. $\frac{2}{2\left(1+x^2\right)}$

Answer: A

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236. $11 If y = \tan^{-1}\left[\frac{\sqrt{1+a^2x^2}-1}{ax}\right], then find \frac{dy}{dx}$

A. $\frac{-a}{1+a^2x^2}$

B. $\frac{a}{1+a^2x^2}$

C. $\frac{-a}{2\left(1+a^2x^2\right)}$

D. $\dfrac{a}{2\left(1 + a^2x^2\right)}$

Answer: D

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237. If $y = \tan^{-1}\left\{\dfrac{\sqrt{1 + x^2} - 1}{x}\right\}$ then $\dfrac{dy}{dx} = ?$

A. $\dfrac{-1}{1 + x^2}$

B. $\dfrac{1}{1 + x^2}$

C. $\dfrac{-1}{2\left(1 + x^2\right)}$

D. $\dfrac{1}{2\left(1 + x^2\right)}$

Answer: D

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238. If $y = \tan^{-1}\left(\sqrt{1+x^2} - x\right)$, $then \frac{dy}{dx} =$

A. $\frac{2}{1+x^2}$

B. $\frac{-2}{1+x^2}$

C. $\frac{1}{2\left(1+x^2\right)}$

D. $\frac{-1}{2\left(1+x^2\right)}$

Answer: D

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239. If $y = \cot^{-1}\sqrt{\frac{x^2+a^2+x}{\sqrt{x^2+a^2}-x}}$, $then \frac{dy}{dx} =$

A. $\frac{-a}{2\left(a^2+x^2\right)}$

B. $\frac{a}{2\left(a^2+x^2\right)}$

C. $\dfrac{-a^2}{2\left(a^2+x^2\right)}$

D. $\dfrac{a^2}{2\left(a^2+x^2\right)}$

Answer: A

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240. $\dfrac{dy}{dx}$ if $y=\cot^{-1}\left(\dfrac{x^x-x^x}{2}\right)atx=1$

A. 2

B. -2

C. 1

D. -1

Answer: D

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241. If $y = \tan^{-1}\left(\frac{6x}{1 - 8x^2}\right)$, $then \frac{dy}{dx} =$

A. $\frac{4}{1 + 16x^2} - \frac{2}{1 + 4x^2}$

B. $\frac{4}{1 + 16x^2} + \frac{2}{1 + 4x^2}$

C. $\frac{2}{1 + 16x^2} - \frac{1}{1 + 4x^2}$

D. $\frac{2}{1 + 16x^2} + \frac{1}{1 + 4x^2}$

Answer: B

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242. $\tan^{-1}\left(\frac{7x}{1 - 12x^2}\right)$

A. $\frac{4}{1 + 16x^2} - \frac{3}{1 + 9x^2}$

B. $\frac{4}{1 + 16x^2} + \frac{3}{1 + 9x^2}$

C. $\frac{2}{1 + 16x^2} - \frac{3}{1 + 9x^2}$

D. $\dfrac{2}{1+16x^2}+\dfrac{3}{1+9x^2}$

Answer: B

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243. If $y=\tan^{-1}\left(\dfrac{a+x}{1-ax}\right)$, $then \dfrac{dy}{dx}=$

A. $\dfrac{1}{1+a^2}$

B. $\dfrac{-1}{1+a^2}$

C. $\dfrac{1}{1+x^2}$

D. $\dfrac{-1}{1+x^2}$

Answer: C

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244. If $y=\tan^{-1}\left(\frac{\log(ex)}{\log\left(\frac{e}{x}\right)}\right)$, *then* $\frac{dy}{dx}=$

A. $\frac{1}{x\left(1+(\log x)^2\right)}$

B. $\frac{-1}{x\left(1+(\log x)^2\right)}$

C. $\frac{x}{x\left(1+(\log x)^2\right)}$

D. $\frac{-x}{x\left(1+(\log x)^2\right)}$

Answer: A

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245. If $y=\tan^{-1}\left(\frac{1+x}{1-x}\right)$ then $\frac{dy}{dx}=$

A. $1-x^2$

B. $1 + x^2$

C. $\dfrac{1}{1 + \left(\frac{1+x}{1-x}\right)^2}$

D. $\dfrac{1}{1 + x^2}$

Answer: D

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246. $\tan^{-1}\left(\dfrac{5x + 1}{3 - x - 6x^2}\right)$

A. $\dfrac{3}{9x^2 + 12x + 5} - \dfrac{2}{2x^2 - 2x + 1}$

B. $\dfrac{3}{9x^2 + 12x + 5} + \dfrac{2}{2x^2 - 2x + 1}$

C. $\dfrac{3}{9x^2 + 12x + 5} - \dfrac{1}{2x^2 - 2x + 1}$

D. $\dfrac{3}{9x^2 + 12x + 5} + \dfrac{1}{2x^2 - 2x + 1}$

Answer: C

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247. If $y = \tan^{-1}\left(\frac{5ax}{a^2 - 6x^2}\right)$, *then* $\frac{dy}{dx} =$

A. $\frac{3}{a^2 + 9x^2} + \frac{2}{a^2 + 4x^2}$

B. $\frac{3}{a^2 + 9x^2} - \frac{2}{a^2 + 4x^2}$

C. $\frac{3a}{a^2 + 9x^2} + \frac{2a}{a^2 + 4x^2}$

D. $\frac{3a}{a^2 + 9x^2} - \frac{2a}{a^2 + 4x^2}$

Answer: A

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248. $\tan^{-1}\left(\frac{a + b\tan x}{b - a\tan x}\right)$

A. 1

B. 0

C. $\dfrac{1}{1+x^2}$

D. $\dfrac{-1}{1+x^2}$

Answer: B

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249. If $y = \tan^{-1}\left(\dfrac{a-x}{1+x^2}\right)$, then $\dfrac{dy}{dx} =$

A. $\dfrac{1}{1+x^2}$

B. $\dfrac{-1}{1+x^2}$

C. $\dfrac{a}{1+x^2}$

D. $\dfrac{-a}{1+x^2}$

Answer: C

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250. $\tan^{-1}\left(\frac{6x}{1+16x^2}\right)$

A. $\frac{4}{1+16x^2} - \frac{1}{1+x^2}$

B. $\frac{4}{1+16x^2} + \frac{1}{1+x^2}$

C. $\frac{8}{1+64x^2} - \frac{2}{1+4x^2}$

D. $\frac{8}{1+64x^2} + \frac{2}{1+4x^2}$

Answer: C

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251. $\tan^{-1}\left(\frac{\sqrt{x}}{1+20x}\right)$

A. $\frac{1}{\sqrt{x}}\left(\frac{5}{1+25x} - \frac{2}{1+16x}\right)$

B. $\frac{1}{\sqrt{x}}\left(\frac{5}{1+25x} + \frac{2}{1+16x}\right)$

C. $\frac{1}{\sqrt{x}}\left(\frac{5}{1+25x} - \frac{4}{1+16x}\right)$

D. $\frac{1}{\sqrt{x}}\left(\frac{5}{1+25x}+\frac{4}{1+16x}\right)$

Answer: C

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252. If $y=\tan^{-1}\left(\frac{\log\left(\frac{e}{x^3}\right)}{\log\left(ex^3\right)}\right)$, then $\frac{dy}{dx}=$

A. $\frac{-3}{x\left(1+3(\log x)^2\right)}$

B. $\frac{3}{x\left(1+3(\log x)^2\right)}$

C. $\frac{-3}{x\left(1+9(\log x)^2\right)}$

D. $\frac{3}{x\left(1+9(\log x)^2\right)}$

Answer: C

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253. If $y=\tan^{-1}\left(\dfrac{\sqrt{a}-\sqrt{x}}{1+\sqrt{ax}}\right)$, *then* $\dfrac{dy}{dx}=$

A. $\dfrac{-1}{\sqrt{x}(1+x)}$

B. $\dfrac{1}{\sqrt{x}(1+x)}$

C. $\dfrac{-1}{2\sqrt{x}(1+x)}$

D. $\dfrac{1}{2\sqrt{x}(1+x)}$

Answer: D

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254. $\tan^{-1}\left(\dfrac{5-x}{6x^2-5x-3}\right)$

A. $\dfrac{2}{2x^2+2x+1}+\dfrac{3}{9x^2-24x+17}$

B. $\dfrac{2}{2x^2+2x+1}-\dfrac{3}{9x^2-24x+17}$

C. $\dfrac{1}{2x^2 + 2x + 1} + \dfrac{3}{9x^2 - 24x + 17}$

D. $\dfrac{1}{2x^2 + 2x + 1} - \dfrac{3}{9x^2 - 24x + 17}$

Answer: D

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255. Find $\dfrac{dy}{dx}$ if $y = \dfrac{\tan^{-1}(4x)}{1 + 5x^2} + \dfrac{\tan^{-1}(2 + 3x)}{3 - 2x}$

A. $\dfrac{-5}{1 + 25x^2}$

B. $\dfrac{5}{1 + 25x^2}$

C. $\dfrac{-25}{1 + 25x^2}$

D. $\dfrac{25}{1 + 25x^2}$

Answer: B

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256. If $y=\tan^{-1}\left(\frac{x-a}{x+a}\right)$, $then\frac{dy}{dx}=$

A. $\frac{-a^2}{a^2+x^2}$

B. $\frac{a^2}{a^2+x^2}$

C. $\frac{-a}{a^2+x^2}$

D. $\frac{a}{a^2+x^2}$

Answer: D

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257. If $y=\tan^{-1}\left(\frac{a\cos x-b\sin x}{b\cos x+a\sin x}\right)$, $then\frac{dy}{dx}=$

A. $\frac{-1}{1+x^2}$

B. $\frac{1}{1+x^2}$

C. -1

D. 1

Answer: C

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258. If $y = \cot^{-1}\left(\frac{1 - x}{1 + x}\right)$ then $\frac{dy}{dx} = ?$

A. $\frac{1}{1 + x^2}$

B. $\frac{-1}{1 + x^2}$

C. $\frac{x}{1 + x^2}$

D. $\frac{-x}{1 + x^2}$

Answer: A

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259. If `y=cot^(-1)[(sqrt(1+sinx)+sqrt(1-sinx))/(sqrt(1+sinx)-sqrt(1-sinx))](0

A. $\frac{-1}{2}$

B. $\frac{1}{2}$

C. -1

D. 1

Answer: B

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260. If $y = \cot^{-1}\left(\frac{3+4\tan x}{4-3\tan x}\right)$, *then* $\frac{dy}{dx} =$

A. -3

B. 4

C. -1

D. 1

Answer: C

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261. If $y = \tan^{-1}\left(\frac{4x}{1+5x^2}\right) + \cot^{-1}\left(\frac{3-2x}{2+3x}\right)$, *then* $\frac{dy}{dx} =$

A. $\frac{5}{1+25x^2} + \frac{2}{1+x^2}$

B. $\frac{5}{1+25x^2} - \frac{2}{1+x^2}$

C. $\frac{-5}{1+25x^2}$

D. $\frac{5}{1+25x^2}$

Answer: D

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262. If the inverse function of $y = f(x)$ is $x = g(y)$ and $f'(x) = \frac{1}{1+x^2}$, then prove that, $g'(x) = 1 + [g(x)]^2$.

A. $(1 + f(x))^2$

B. $(1 + g(x))^2$

C. $1 + (f(x))^2$

D. $1+(g(x))^2$

Answer: D

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263. If g is the inverse of a function f and $f'(x)=\frac{1}{1+x^5}$, then g'(x) is equal to

A. $1+x^5$

B. $5x^4$

C. $\frac{1}{1+(g(x))^5}$

D. $1+(g(x))^5$

Answer: D

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264. Let $f(x) = \frac{x^2 - x}{x^2 + 2x}$ then $d\frac{f^{-1}x}{dx}$ is equal to

A. $\frac{-3}{(1 - x)^2}$

B. $\frac{3}{(1 - x)^2}$

C. $\frac{-1}{(1 - x)^2}$

D. $\frac{1}{(1 - x)^2}$

Answer: B

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265. If $y = e^{m\sin^{-1}x}$ and $(1 - x^2)\left(\frac{dy}{dx}\right)^2 = Ay^2$. then A =

A. m

B. $-m$

C. m^2

D. $-m^2$

Answer: C

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266. If $y = (x+3)^4(x+4)^5(x+5)^6, then \dfrac{dy}{dx} =$

A. $y\left(\dfrac{4}{x+3} - \dfrac{5}{x+4} - \dfrac{6}{x+5}\right)$

B. $y\left(\dfrac{4}{x+3} - \dfrac{5}{x+4} + \dfrac{6}{x+5}\right)$

C. $y\left(\dfrac{4}{x+3} + \dfrac{5}{x+4} + \dfrac{6}{x+5}\right)$

D. $y\left(\dfrac{4}{x+3} + \dfrac{5}{x+4} - \dfrac{6}{x+5}\right)$

Answer: C

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267. If $y = (x+1)^{\frac{3}{2}}(2x+3)^{\frac{5}{2}}(7-3x)^{\frac{7}{2}}, then \dfrac{dy}{dx} =$

A. $y\left(\frac{3}{2x+2}-\frac{5}{2x+3}-\frac{21}{14-16x}\right)$

B. $y\left(\frac{3}{2x+2}-\frac{5}{2x+3}+\frac{21}{14-16x}\right)$

C. $y\left(\frac{3}{2x+2}+\frac{5}{2x+3}-\frac{21}{14-16x}\right)$

D. $y\left(\frac{3}{2x+2}+\frac{5}{2x+3}+\frac{21}{14-16x}\right)$

Answer: C

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268. If $y = e^{3x}\sin^2 x\log x$, *then* $\frac{dy}{dx} =$

A. $y\left(3-2\cot x+\frac{1}{x\log x}\right)$

B. $y\left(3+2\cot x-\frac{1}{x\log x}\right)$

C. $y\left(3+2\cot x+\frac{1}{x\log x}\right)$

D. $y\left(3-2\cot x-\frac{1}{x\log x}\right)$

Answer: C

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269. If $y = \sqrt{\frac{(x-1)(x-2)}{(x-3)(x-4)(x-5)}}$ then $\frac{dy}{dx}$ is equal to

A. $\frac{y}{2}\left(\frac{1}{x-1} + \frac{1}{x-2} + \frac{1}{x-3} - \frac{1}{x-4} - \frac{1}{x-5}\right)$

B. $\frac{y}{2}\left(\frac{1}{x-1} + \frac{1}{x-2} - \frac{1}{x-3} - \frac{1}{x-4} - \frac{1}{x-5}\right)$

C. $\frac{y}{2}\left(\frac{1}{x-1} + \frac{1}{x-2} - \frac{1}{x-3} + \frac{1}{x-4} - \frac{1}{x-5}\right)$

D. $\frac{y}{2}\left(\frac{1}{x-1} + \frac{1}{x-2} - \frac{1}{x-3} - \frac{1}{x-4} + \frac{1}{x-5}\right)$

Answer: B

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270. If $y = \sqrt{\frac{(x-3)\left(x^2+4\right)}{\left(3x^2+4x+5\right)}}$, find $\frac{dy}{dx}$.

A. $y = \left(\frac{1}{2x - 6} + \frac{x}{x^2 + 4} - \frac{3x + 2}{3x^2 + 4x + 5}\right)$

B. $y = \left(\frac{1}{2x - 6} - \frac{x}{x^2 + 4} + \frac{3x + 2}{3x^2 + 4x + 5}\right)$

C. $y = \left(\frac{1}{2x - 6} - \frac{x}{x^2 + 4} - \frac{3x + 2}{3x^2 + 4x + 5}\right)$

D. $y = \left(\frac{1}{2x - 6} + \frac{x}{x^2 + 4} + \frac{3x + 2}{3x^2 + 4x + 5}\right)$

Answer: A

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271. $y = \sqrt{\frac{(2x + 3)^5}{(3x - 1)^3(5x - 2)}}$

A. $\frac{y}{2}\left(\frac{10}{2x + 3} - \frac{9}{3x - 1} - \frac{5}{5x - 2}\right)$

B. $\frac{y}{2}\left(\frac{10}{2x + 3} + \frac{9}{3x - 1} - \frac{5}{5x - 2}\right)$

C. $\frac{y}{2}\left(\frac{10}{2x + 3} - \frac{9}{3x - 1} + \frac{5}{5x - 2}\right)$

D. $\frac{y}{2}\left(\frac{10}{2x+3}+\frac{9}{3x-1}+\frac{5}{5x-2}\right)$

Answer: A

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272. If $y = 3\sqrt{\frac{3x-1}{(2x+3)(5-x)^2}}, then \frac{dy}{dx} =$

A. $y\left(\frac{1}{3x-1}-\frac{2}{6x+9}+\frac{2}{15-3x}\right)$

B. $y\left(\frac{1}{3x-1}+\frac{2}{6x+9}-\frac{2}{15-3x}\right)$

C. $y\left(\frac{1}{3x-1}-\frac{2}{6x+9}-\frac{2}{15-3x}\right)$

D. $y\left(\frac{1}{3x-1}+\frac{2}{6x+9}+\frac{2}{15-3x}\right)$

Answer: A

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273. If $\frac{x+1}{(x+2)^2(x+3)^4}$, $then\frac{dy}{dx} =$

A. $y\left(\frac{1}{x+1}+\frac{2}{x+2}+\frac{4}{x+3}\right)$

B. $y\left(\frac{1}{x+1}+\frac{2}{x+2}-\frac{4}{x+3}\right)$

C. $y\left(\frac{1}{x+1}-\frac{2}{x+2}+\frac{4}{x+3}\right)$

D. $y\left(\frac{1}{x+1}-\frac{2}{x+2}-\frac{4}{x+3}\right)$

Answer: D

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274. $y = \frac{x^3\tan^5 x}{\tan 4x}$

A. $y\left(\frac{3}{x}+10\operatorname{cos}ec2x+8\operatorname{cos}ec8x\right)$

B. $y\left(\frac{3}{x}+10\operatorname{cos}ec2x-8\operatorname{cos}ec8x\right)$

C. $y\left(\frac{3}{x}-10\operatorname{cos}ec2x+8\operatorname{cos}ec8x\right)$

D. $y\left(\frac{3}{x} - 10\cos ec2x - 8\cos ec8x\right)$

Answer: B

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275. If $y = \frac{(\cos x)^x}{1 + x - x^2}, then \frac{dy}{dx} =$

A. $y\left(\log(\cos x) + x\tan x + \frac{2x - 1}{1 + x - x^2}\right)$

B. $y\left(\log(\cos x) - x\tan x - \frac{2x - 1}{1 + x - x^2}\right)$

C. $y\left(\log(\cos x) + x\tan x - \frac{2x - 1}{1 + x - x^2}\right)$

D. $y\left(\log(\cos x) - x\tan x + \frac{2x - 1}{1 + x - x^2}\right)$

Answer: D

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276. If $y = \frac{(\sin x)^{\log x}}{1 + x^2}$, *then* $\frac{dy}{dx} =$

A. $y\left((\log x)\cot x + \frac{\log(\sin x)}{x} + \frac{2x}{1 + x^2}\right)$

B. $y\left((\log x)\cot x + \frac{\log(\sin x)}{x} - \frac{2x}{1 + x^2}\right)$

C. $y\left((\log x)\cot x - \frac{\log(\sin x)}{x} + \frac{2x}{1 + x^2}\right)$

D. $y\left((\log x)\cot x - \frac{\log(\sin x)}{x} - \frac{2x}{1 + x^2}\right)$

Answer: B

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277. if $y = x^x$ then $\frac{dy}{dx}$

A. $x^x(1 + x\log x)$

B. $x^x(1 - x\log x)$

C. $x^x(1 + \log x)$

D. $x^x(1 - \log x)$

Answer: C

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278. If $y = \sqrt{x}^x$, then $\frac{dy}{dx}$

A. $\frac{\sqrt{x}^x}{2}(1 + \log x)$

B. $\frac{\sqrt{x}^x}{2}(x + \log x)$

C. $\sqrt{x}^x(1 + \log x)$

D. $\sqrt{x}^x(x + \log x)$

Answer: A

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279. If $y = x^{\frac{1}{x}}$, then $\frac{dy}{dx} =$

A. $\dfrac{x^{\frac{1}{x}}}{x^2}(1 + \log x)$

B. $\dfrac{x^{\frac{1}{x}}}{x^2}(1 - \log x)$

C. $\dfrac{x^{\frac{1}{x}}}{x}(1 + \log x)$

D. $\dfrac{x^{\frac{1}{x}}}{x}(1 - \log x)$

Answer: B

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280. If $y = \left(\dfrac{x+1}{x}\right)^x$, then $\dfrac{dy}{dx} =$

A. $y\left(\log\left(1 + \dfrac{1}{x}\right) - \dfrac{x}{1+x}\right)$

B. $y\left(\log\left(1 + \dfrac{1}{x}\right) + \dfrac{x}{1+x}\right)$

C. $y\left(\log\left(1 + \dfrac{1}{x}\right) - \dfrac{x}{1+x}\right)$

D. $y\left(\log\left(1 + \dfrac{1}{x}\right) + \dfrac{x}{1+x}\right)$

Answer: C

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281. If $y = e^{x^x}$, then $\frac{dy}{dx}$ is

A. $e^{x^x}x^x(1 - \log x)\log x$

B. $e^{x^x}x^x(1 + \log x)\log x$

C. $e^{x^x}x^x(1 - \log x)$

D. $e^{x^x}x^x(1 + \log x)$

Answer: D

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282. If $y = e^{x^x}$, then $\frac{dy}{dx}$ is

A. $x^{x^x}x^x\log x\left(1 + \log x - \frac{1}{x\log x}\right)$

B. $x^{x^x}x^x\log x\left(1 + \log x + \frac{1}{x\log x}\right)$

C. $x^{x^x}x^x\left(1 + \log x - \frac{1}{x}\right)$

D. $x^{x^x}x^x\left(1 + \log x + \frac{1}{x}\right)$

Answer: B

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283. If $y = x^{x^{2x}}, then \frac{dy}{dx} =$

A. $x^{x^{2x}}x^{2x}\log x\left(2 + 2\log x + \frac{1}{x\log x}\right)$

B. $x^{x^{2x}}x^{2x}\log x\left(2 + \log x + \frac{1}{x\log x}\right)$

C. $x^{x^{2x}}x^{2x}\left(2 + 2\log x + \frac{1}{x\log x}\right)$

D. $x^{x^{2x}}x^{2x}\left(2 + \log x + \frac{1}{x\log x}\right)$

Answer: A

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284. If $y = x^{e^x}$, $then \dfrac{dy}{dx} =$

A. $x^{e^x} e^x \left(\dfrac{1}{x} + x\log x\right)$

B. $x^{e^x} e^x \left(\dfrac{1}{x} - x\log x\right)$

C. $x^{e^x} e^x \left(\dfrac{1}{x} + \log x\right)$

D. $x^{e^x} e^x \left(\dfrac{1}{x} - \log x\right)$

Answer: C

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285. If $y = x^{4^x}$, $then \dfrac{dy}{dx} =$

A. $x^{4x} 4^x \left(\dfrac{1}{x} + \log 4.\ \log x\right)$

B. $x^{4^x} 4^x \left(\dfrac{1}{x} - \log 4.\ \log x\right)$

C. $x^{4^x}4^x\left(\frac{1}{x} + \log 4 . x\right)$

D. $x^{4^x}4^x\left(\frac{1}{x} - \log x\right)$

Answer: A

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286. If $y = (\tan x)^{\cot x}$, then $\frac{dy}{dx}$ is equal to......

A. $y = \operatorname{cosec}^2 x \log(\tan x)$

B. $y \operatorname{cosec}^2 x(1 + \log(\tan x))$

C. $y \operatorname{cosec}^2 x(\log(\tan x) - 1)$

D. $y \operatorname{cosec}^2 x(1 - \log(\tan x))$

Answer: D

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287. If $y = (\tan x)^{\sin x}$, *then* $\frac{dy}{dx} =$

A. $y\left(\sec^2 x + \cos x\right)\log(\tan x)\Big)$

B. $y\left(\sec^2 x - (\cos x)\log(\tan x)\right)$

C. $y(\sec x + (\cos x)\log(\tan x))$

D. $y(\sec x - (\cos x)\log(\tan x))$

Answer: C

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288. If $y = (\sin x - \cos x)^{(\sin x + \cos x)}$, *then* $\frac{dy}{dx} =$

A. $y\left(\frac{(\sin x + \cos x)^2}{\sin x - \cos x} + (\cos x - \sin x)\log(\sin x - \cos x)\right)$

B. $y\left(\frac{(\sin x + \cos x)^2}{\sin x - \cos x} - (\cos x - \sin x)\log(\sin x - \cos x)\right)$

C. $y\left(\frac{\sin x + \cos x}{\sin x - \cos x} + (\cos x - \sin x)\log(\sin x - \cos x)\right)$

D. $y\left(\frac{\sin x + \cos x}{\sin x - \cos x} - (\cos x - \sin x)\log(\sin x - \cos x)\right)$

Answer: A

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289. If $y = (\sin x + \cos x)^{(1 + \tan x)}$, $then\frac{dy}{dx} =$

A. $y\left(1 + \tan x + \left(\sec^2 x\right)\log(\sin x + \cos x)\right)$

B. $y\left(1 - \tan x - \left(\sec^2 x\right)\log(\sin x + \cos x)\right)$

C. $y\left(1 + \tan x - \left(\sec^2 x\right)\log(\sin x + \cos x)\right)$

D. $y\left(1 - \tan x + \left(\sec^2 x\right)\log(\sin x + \cos x)\right)$

Answer: D

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290. If $y = x^{\tan^{-1}x}$,then $\frac{dy}{dx} =$

A. $y\left(\frac{\tan^{-1}x}{x}+\frac{\log x}{1+x^2}\right)$

B. $y\left(\frac{\tan^{-1}x}{x}-\frac{\log x}{1+x^2}\right)$

C. $\frac{y}{2}\left(\frac{\tan^{-1}x}{x}+\frac{\log x}{1+x^2}\right)$

D. $\frac{y}{2}\left(\frac{\tan^{-1}x}{x}-\frac{\log x}{1+x^2}\right)$

Answer: A

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291. If $y=x^{\sin x}$ then $\frac{dy}{dx}=\ ?$

A. $\frac{y(\cos x\log x+\cos x)}{x}$

B. $\frac{y(x\cos x\log x+\sin x)}{x}$

C. $y(x\sin x\log x+\cos x)$

D. $\frac{y(x\cos x\log x+\sin x)}{x}$

Answer: B

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292. If $y = x^{\log x}, \textit{then} \frac{dy}{dx} =$

A. $2x^{(\log x - 1)} \log x$

B. $x^{(\log x - 1)}$

C. $\frac{2}{x \log x}$

D. $x^{(\log x - 1)} \log x$

Answer: A

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293. If $y = \left(\sec^2 x\right)^{\frac{1}{x}}, \textit{then} \frac{dy}{dx} =$

A. $\frac{2y}{x^2}(\tan x + \log x \sec x)$

B. $\frac{2y}{x^2}(\tan x - \log\sec x)$

C.

D. $\frac{2y}{x^2}(x\tan x - \log\sec x)$

Answer: D

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294. If $y = (x\cos x - \sin x)^x, then \frac{dy}{dx} =$

A. $y\left(\log(x\cos x - \sin x) + \frac{x\sin x}{x\cos x - \sin x}\right)$

B. $y\left(\log(x\cos x - \sin x) - \frac{x\sin x}{x\cos x - \sin x}\right)$

C. $y\left(\log(x\cos x - \sin x) + \frac{x^2\sin x}{x\cos x - \sin x}\right)$

D. $y\left(\log(x\cos x - \sin x) - \frac{x^2\sin x}{x\cos x - \sin x}\right)$

Answer: D

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295. If $y=(x\tan x)^{\sec x}$, then $\frac{dy}{dx}=$

A. $y\sec x\left(\frac{1}{x}-2\operatorname{cosec}2x-(\tan x)\log(x\tan x)\right)$

B. $y\sec x\left(\frac{1}{x}+2\operatorname{cosec}2x+(\tan x)\log(x\tan x)\right)$

C. $y\sec x\left(\frac{1}{x}-2\operatorname{cosec}2x+(\tan x)\log(x\tan x)\right)$

D. $y\sec x\left(\frac{1}{x}+2\operatorname{cosec}2x-(\tan x)\log(x\tan x)\right)$

Answer: B

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296. If ,$y=(\log x)^{\sin x}$, then $\frac{dy}{dx}=$

A. $y\left(\frac{\sin x}{x\log x}-(\cos x)\log(\log x)\right)$

B. $y\left(\frac{\sin x}{x\log x}+(\cos x)\log(\log x)\right)$

C. $y\left(\frac{\cos x}{x\log x} - (\sin x)\log(\log x)\right)$

D. $y\left(\frac{\cos x}{x\log x} + (\sin x)\log(\log x)\right)$

Answer: B

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297. If $y = (\sin x)^{\log x}, then \frac{dy}{dx} =$

A. $y\left(\frac{\log\sin x}{x} + \cot x\right)$

B. $y\left(\frac{\log\sin x}{x} + \log x\right)$

C. $y\left(\frac{\log x}{\tan x} + \frac{\log\sin x}{x}\right)$

D.

Answer: C

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298. If $y = (\log x)^{\log x}$, *then* $\frac{dy}{dx} =$

A. $y(1 + \log(\log x))$

B. $y(1 + \log x)$

C. $\frac{y}{x}(1 + \log(\log x))$

D. $\frac{y}{x}(1 + \log x)$

Answer: C

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299. If $y = (\tan x)^{(\tan x)^{(\tan x)^{(\tan x)\ldots\ldots\infty}}}$, then prove that $\frac{dy}{dx} = 2$ at $x = \frac{\pi}{4}$

A. 1

B. $\sqrt{2}$

C. -2

D. 2

Answer: D

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300. If $y = x^x + a^a, then \frac{dy}{dx} =$

A. $-x^x(1 + \log x)$

B. $-x^x(1 - \log x)$

C. $x^x(1 - \log x)$

D. $x^x(1 + \log x)$

Answer: D

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301. If $y = x^{\sin x} + \sqrt{x}, then$ at $= \frac{\pi}{2}, \frac{dy}{dx} =$

A. $1 + \frac{1}{\sqrt{2\pi}}$

B. $1 - \frac{1}{\sqrt{2\pi}}$

C. 1

D. $\frac{1}{\sqrt{2\pi}}$

Answer: A

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302. If $y = \cos^{-1}\left[\sin\sqrt{\frac{(1+x)}{2}}\right] + x^x$,then find $\frac{dy}{dx}$ at $x = 1$

A. $\frac{1}{2}$

B. $\frac{-1}{2}$

C. $\frac{3}{4}$

D. 0

Answer: C

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303. If $y = e^{\tan x} + (\log x)^{\tan x}$ then find $\frac{dy}{dx}$

A. $e^{\tan x}\sec^2 x + (\log x)^{\tan x}\left(\frac{\tan x}{x\log x} - \log(\log x)\sec^2 x\right)\Big)$

B. $e^{\tan x}\sec^2 x + (\log x)^{\tan x}\left(\frac{\tan x}{x\log x} + \log(\log x)\sec^2 x\right)\Big)$

C. $e^{\tan x}\sec^2 x + (\log x)^{\tan x}\left(\frac{\tan x}{\log x} - \log(\log x)\sec^2 x\right)\Big)$

D. $e^{\tan x}\sec^2 x + (\log x)^{\tan x}\left(\frac{\tan x}{\log x} + \log(\log x)\sec^2 x\right)\Big)$

Answer: B

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304. IF $y = x^{x^3} + \left(x^3\right)$, $then\frac{dy}{dx} =$

A. $x^{x^3}x^2(1 + 3\log x) + x^{3x}(1 + \log x)$

B. $x^{x^3}x^2(1 + \log x) + 3x^{3x}(1 + \log x)$

C. $x^{x^3}x^2(1 + \log x) + x^{3x}(1 + \log x)$

D. $x^{x^3}x^2(1 + \log x) + 3x^{3x}(1 + \log x)$

Answer: D

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305. If $y = x^x + (\tan x)^x$, $then\dfrac{dy}{dx} =$

A. $x^x(1 + \log x) + (\tan x)^x(2x\operatorname{cosec}2x - \log(\tan x))$

B. $x^x(1 + \log x) + (\tan x)^x(2x\operatorname{cosec}2x + \log(\tan x))$

C. $x^x(1 + \log x) + (\tan x)^x(x\operatorname{cosec}2x - \log(\tan x))$

D. $x^x(1 + \log x) + (\tan x)^x(x\operatorname{cosec}2x + \log(\tan x))$

Answer: B

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306. If$y = (2x)^{\sec x} + (\tan x)^x$, $then\dfrac{dy}{dx} =$

A. $(2x)^{\sec x}\sec x\left(\frac{1}{x} + \tan x\log(2x)\right) + 2(\sec x)^{2x}(x\tan x + \log(\sec x))$

B. $(2x)^{\sec x}\sec x\left(\frac{1}{x} + \tan x\log(2x)\right) + 2(\sec x)^{2x}(\tan x + \log(\sec x))$

C. $(2x)^{\sec x}\sec x\left(\frac{1}{x} + \tan x\log(2x)\right) + (\sec x)^{2x}(x\tan x + \log(\sec x))$

D. $(2x)^{\sec x}\sec x\left(\frac{1}{x} + \tan x\log(2x)\right) + (\sec x)^{2x}(\tan x + \log(\sec x))$

Answer: A

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307. If $y = (\sin x)^{\tan x} + (\cos x)^{\sec x}, \textit{ then} \frac{dy}{dx}$

A. $(\sin x)^{\tan x}\left(1 + \log(\sin x)\sec^2 x\right) + (\cos x)^{\sec x}\sec x\tan x(\log(\cos x) + 1)$

B. $(\sin x)^{\tan x}\left(1 - \log(\sin x)\sec^2 x\right) + (\cos x)^{\sec x}\sec x\tan x(\log(\cos x) - 1)$

C. $(\sin x)^{\tan x}\left(1 - \log(\sin x)\sec^2 x\right) + (\cos x)^{\sec x}\sec x\tan x(\log(\cos x) + 1)$

D. $(\sin x)^{\tan x}\left(1 + \log(\sin x)\sec^2 x\right) + (\cos x)^{\sec x}\sec x\tan x(\log(\cos x) - 1)$

Answer: D

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308. If $y = \left(x + \frac{1}{x}\right)^x + x^{\left(x + \frac{1}{x}\right)}$, $then \frac{dy}{dx} =$

A. $\left(x + \frac{1}{x}\right)^x \left(\frac{x^2 - 1}{x^2 + 1} + \log\left(x + \frac{1}{x}\right)\right) + x^{\left(x + \frac{1}{x}\right)}\left(\frac{x^2 + 1}{x^2} - \left(\frac{x^2 - 1}{x^2}\right)\log x\right)$

B. $\left(x + \frac{1}{x}\right)^x \left(\frac{x^2 - 1}{x^2 + 1} + \log\left(x + \frac{1}{x}\right)\right) + x^{\left(x + \frac{1}{x}\right)}\left(\frac{x^2 + 1}{x^2} + \left(\frac{x^2 - 1}{x^2}\right)\log x\right)$

C. $\left(x + \frac{1}{x}\right)^x \left(\frac{x^2 - 1}{x^2 + 1} + \log\left(x + \frac{1}{x}\right)\right) + x^{\left(x + \frac{1}{x}\right)}\left(\frac{x^2 + 1}{x} - \left(\frac{x^2 - 1}{x^2}\right)\log x\right)$

D. $\left(x + \frac{1}{x}\right)^x \left(\frac{x^2 - 1}{x^2 + 1} + \log\left(x + \frac{1}{x}\right)\right) + x^{\left(x + \frac{1}{x}\right)}\left(\frac{x^2 + 1}{x} + \left(\frac{x^2 - 1}{x^2}\right)\log x\right)$

Answer: A

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309. If $y = \left(\sin^{-1}x\right)^x + (x)^{\cos^{-1}x}$, $then \frac{dy}{dx}$

A. $\left(\sin^{-1}x\right)^x\left(\log\sin^{-1}x - \frac{x}{\sqrt{1-x^2\sin x}}\right) + x^{\cos^{-1}x}\left(\frac{\cos^{-1}x +}{x} + \frac{\log x}{\sqrt{1-x^2}}\right)$

B. $\left(\sin^{-1}x\right)^x\left(\log\sin^{-1}x - \frac{x}{\sqrt{1-x^2\sin x}}\right) - x^{\cos^{-1}x}\left(\frac{\cos^{-1}x +}{x} + \frac{\log x}{\sqrt{1-x^2}}\right)$

C.

D. $\left(\sin^{-1}x\right)^x\left(\log\sin^{-1}x - \frac{x}{\sqrt{1-x^2\sin x}}\right) + x^{\cos^{-1}x}\left(\frac{\cos^{-1}x +}{x} - \frac{\log x}{\sqrt{1-x^2}}\right)$

Answer: C

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310. If $y = x^{\sin x} + (\sin x)^x, then \frac{dy}{dx} =$

A. $x^{\sin x}\left((\cos x)(\log x) - \frac{\sin x}{x}\right) + (\sin x)^x(\log\sin x - x\cot x)$

B. $x^{\sin x}\left((\cos x)(\log x) + \frac{\sin x}{x}\right) + (\sin x)^x(\log\sin x + x\cot x)$

C. $x^{\sin x}\left((\cos x)(\log x) - \frac{\sin x}{x}\right) - (\sin x)^x(\log\sin x + x\cot x)$

D. $x^{\sin x}\left((\cos x)(\log x) + \frac{\sin x}{x}\right) + (\sin x)^x(\log\sin x - x\cot x)$

Answer: B

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311. If $y = (\log x)^x - x^{\log x}, then \dfrac{dy}{dx} =$

A. $(\log x)^x\left(\dfrac{1}{\log x} + \log(\log x)\right) + \dfrac{(\log x)x^{\log x}}{x}$

B. $(\log x)^x\left(\dfrac{1}{\log x} + \log(\log x)\right) - \dfrac{(\log x)x^{\log x}}{x}$

C. $(\log x)^x\left(\dfrac{1}{\log x} + \log(\log x)\right) + \dfrac{2(\log x)x^{\log x}}{x}$

D. $(\log x)^x\left(\dfrac{1}{\log x} + \log(\log x)\right) - \dfrac{2(\log x)x^{\log x}}{x}$

Answer: D

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312. If $y = (x\cos x)^x + (x\sin x)^{\frac{1}{x}}, then \dfrac{dy}{dx} =$

A. $(x\cos x)^x(1 + x\tan x + \log(x\cos x)) + \frac{(x\sin x)^{\frac{1}{x}}}{x^2}(1 + x\cot x + \log(x\sin x))$

B. $(x\cos x)^x(1 - x\tan x + \log(x\cos x)) + \frac{(x\sin x)^{\frac{1}{x}}}{x^2}(1 + x\cot x + \log(x\sin x))$

C. $(x\cos x)^x(1 - x\tan x + \log(x\cos x)) + \frac{(x\sin x)^{\frac{1}{x}}}{x^2}(1 + x\cot x - \log(x\sin x))$

D. $(x\cos x)^x(1 + x\tan x + \log(x\cos x)) + \frac{(x\sin x)^{\frac{1}{x}}}{x^2}(1 + x\cot x - \log(x\sin x))$

Answer: C

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313. If $y = x^x + a^x + x^a + a^a, then \frac{dy}{dx} =$

A. $x^x(1 + \log x) + a^x \log a + a + ax^{a-1}$

B. $x^x(1 + \log x) + a^x \log a + (a - 1)x^{a-1}$

C. $x^x(1 + \log x) + a^x \log a + ax^{a-2}$

D. $x^x(1 + \log x) + a^x \log a + (a - 2)x^{a-2}$

Answer: A

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314. If $y = (\sin x)^x + \log x + (\log x)^{\tan x} + x^a$, *then* $\frac{dy}{dx} =$

A. $(\sin x)^x(\log(\sin x) + x\cot x) + \frac{1}{x} + (\log x)^{\tan x}\left(\sec^2 x.\log(\log x) - \frac{\tan x}{x\log x}\right) + ax^{a-1}$

B. $(\sin x)^x(\log(\sin x) + x\cot x) + \frac{1}{x} + (\log x)^{\tan x}\left(\sec^2 x.\log(\log x) + \frac{\tan x}{x\log x}\right) + ax^{a-1}$

C. $(\sin x)^x(\log(\sin x) + x\cot x) + \frac{1}{x} + (\log x)^{\tan x}\left(\sec^2 x.\log(\log x) - \frac{\tan x}{\log x}\right) + ax^{a-1}$

D. $(\sin x)^x(\log(\sin x) + x\cot x) + \frac{1}{x} + (\log x)^{\tan x}\left(\sec^2 x.\log(\log x) + \frac{\tan x}{\log x}\right) + ax^{a-1}$

Answer: B

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315. If $y = 10^{x^x} + x^{x^{10}} + x^{10^x}$, then $\frac{dy}{dx}$

A. $10^{x^x}x^x(1 + \log x) + x^{x^{10}}x^9(1 + 10\log x) + x^{10x}10^x\left(\frac{1}{x} + \log 10 \cdot \log x\right)$

B.

$$10^{x^x}x^x\log 10(1 + \log x) + x^{x^{10}}x^9(1 + 10\log x) + x^{10x}10^x\left(\frac{1}{x} + \log 10 \cdot \log x\right)$$

C.

$$10^{x^x}x^x\log 10(1 + \log x) + x^{x^{10}}x^9(1 + 10\log x) + x^{10x}10^x\left(\frac{1}{x} + \log 10 \cdot \log x\right)$$

D. $10^{x^x}x^x\log 10(1 + \log x) + x^{x^{10}}x^9(1 + 10\log x) + x^{10x}10^x\left(\frac{1}{x} + \log(10x)\right)$

Answer: C

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316. If $\sqrt{x} + \sqrt{y} = \sqrt{a}$ then $\frac{dy}{dx} = ?$

A. $-\sqrt{\frac{y}{x}}$

B. $\sqrt{\frac{y}{x}}$

C. $\sqrt{\frac{x}{y}}$

D. $-\sqrt{\frac{x}{y}}$

Answer: A

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317. If $x\sqrt{x} + y\sqrt{y} = a\sqrt{a}, then \frac{dy}{dx} =$

A. $-\sqrt{\frac{y}{x}}$

B. $\sqrt{\frac{y}{x}}$

C. $-\sqrt{\frac{x}{y}}$

D. $\sqrt{\frac{x}{y}}$

Answer: C

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318. If $\sqrt{\frac{y}{x}}+\sqrt{\frac{x}{y}}=6$, then $\frac{dy}{dx}$ is

A. $-\frac{y}{x}$

B. $\frac{y}{x}$

C. $-\frac{x}{y}$

D. $\frac{x}{y}$

Answer: B

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319. If $\sqrt{\frac{y}{x}}+\sqrt{\frac{x}{y}}=6$, then $\frac{dy}{dx}$ is

A. $-\left(\frac{17y-x}{y-17x}\right)$

B. $-\left(\frac{y-17x}{17y-x}\right)$

C. $\frac{y-17x}{17y-x}$

D. $\frac{17y - x}{y - 17x}$

Answer: C

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320. If $x^{\frac{2}{3}} + y^{\frac{2}{3}} = 10^{\frac{2}{3}}$, then $\frac{dy}{dx}$ =

A. $-\sqrt{\frac{y}{x}}$

B. $\sqrt{\frac{y}{x}}$

C. $-3\sqrt{\frac{y}{x}}$

D. $3\sqrt{\frac{y}{x}}$

Answer: C

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321. If $y = \sqrt{x - 1} + \sqrt{x + 1}$, then $\frac{dy}{dx}$

A. $\frac{2y}{\sqrt{x^2 - 1}}$

B. $\frac{-2y}{\sqrt{x^2 - 1}}$

C. $\frac{y}{2\sqrt{x^2 - 1}}$

D. $\frac{-y}{2\sqrt{x^2 - 1}}$

Answer: C

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322. If $x^3 + y^3 + 4x^3y = 0, then \frac{dy}{dx} =$

A. $\frac{3x^2(1 + 4y)}{4x^3 + 3y^2}$

B. $\frac{-3x^2(1 + 4y)}{4x^3 + 3y^2}$

C. $\frac{4x^3(1 + 4y)}{3x^2 + 3y^2}$

D. $-\left(\frac{4x^3(1 + 4y)}{3x^2 + 3y^2}\right)$

Answer: B

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323. If $x+\sqrt{xy}+y=1, then \frac{dy}{dx}=$

A. $\frac{2\sqrt{xy}+x}{2\sqrt{xy}+y}$

B. $\frac{2\sqrt{xy}+y}{2\sqrt{xy}+x}$

C. $-\left(\frac{2\sqrt{xy}+x}{2\sqrt{xy}+y}\right)$

D. $-\left(\frac{2\sqrt{xy}+y}{2\sqrt{xy}+x}\right)$

Answer: D

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324. If $y^3-3y^2x=x^3+3x^2y, then \frac{dy}{dx}=$

A. $\dfrac{x^2 + 2xy + y^2}{y^2 - 2xy - x^2}$

B. $\dfrac{x^2 + 2xy + y^2}{y^2 + 2xy - x^2}$

C. $\dfrac{x^2 - 2xy - y^2}{y^2 + 2xy + x^2}$

D. $\dfrac{x^2 + 2xy - y^2}{y^2 + 2xy + x^2}$

Answer: A

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325. if $\sqrt{y + x} + \sqrt{y - x} = c$ then find $\dfrac{dy}{dx}$

A. $\dfrac{y}{x} - \sqrt{\dfrac{y^2}{x^2} - 1}$

B. $\dfrac{y}{x} + \sqrt{\dfrac{y^2}{x^2} - 1}$

C. $\dfrac{y}{x} - \sqrt{1 - \dfrac{y^2}{x^2}}$

D. $\dfrac{y}{x} + \sqrt{1 - \dfrac{y^2}{x^2}}$

Answer: A

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326. Find $\frac{dy}{dx}$ in the following:$x^2 + xy + y^2 = 100$

A. $\frac{x+2y}{2x+y}$

B. $\frac{2x+y}{x+2y}$

C. $-\left(\frac{x+2y}{2x+y}\right)$

D. $-\left(\frac{2x+y}{x+2y}\right)$

Answer: D

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327. If $x^4 + y^4 + 5x^3y = 0 then \frac{dy}{dx} =$

A. $\dfrac{-x^2\left(4y^3+5x^3\right)}{15y+4x}$

B. $\dfrac{x^2\left(4y^3+5x^3\right)}{15y+4x}$

C. $\dfrac{-x^2\left(15y^3+5x^3\right)}{4y+4x}$

D. $\dfrac{x^2\left(15y^3+5x^3\right)}{4y+4x}$

Answer: C

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328. If $y\sqrt{1-x^2}+x\sqrt{1-y^2}=1, then \dfrac{dy}{dx}=$

A. $\dfrac{-2\sqrt{1-y^2}}{\sqrt{1-x^2}}$

B. $\dfrac{2\sqrt{1-y^2}}{\sqrt{1-x^2}}$

C. $\dfrac{-\sqrt{1-y^2}}{2\sqrt{1-x^2}}$

D. $\dfrac{x^2\left(15y^3 + 5x^3\right)}{4y + 4x}$

Answer: D

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329. If $x = y\sqrt{1 - y^2}$, *then* $\dfrac{dy}{dx}$

A. $\dfrac{\sqrt{1 - y^2}}{1 + 2y^2}$

B. $\dfrac{\sqrt{1 - y^2}}{1 - 2y^2}$

C. 0

D. x

Answer: B

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330. $x\sqrt{1+y}+y\sqrt{1+x}=0$ then $\dfrac{dy}{dx}=$

A. $1+x$

B. $(1+x)^{-2}$

C. $-(1+x)^{-1}$

D. $-(1+x)^{-2}$

Answer: D

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331. If $\dfrac{x}{\sqrt{1+x}}+\dfrac{y}{\sqrt{1+y}}=0$ and $x \neq y$, then $\dfrac{dy}{dx}=$

A. $1+x$

B. $(1+x)^{-2}$

C. $-(1+x)^{-1}$

D. $-(1+x)^{-2}$

Answer: D

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332. $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$

A. $\frac{-y}{x}$

B. $\frac{y}{x}$

C. $\frac{-x}{y}$

D. $\frac{x}{y}$

Answer: B

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333. $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$

A. $-\left(\frac{hx + by + f}{ax + hy + g}\right)$

B. $-\left(\frac{ax + hy + g}{hx + by + f}\right)$

C. $\frac{ax + hy + g}{hx + by + f}$

D. $\frac{hx + by + f}{ax + hy + g}$

Answer: B

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334. If $\sqrt{1 - x^2} + \sqrt{1 - y^2} = a(x - y)$, then $\frac{dy}{dx}$ equals

A. $\sqrt{\frac{1 - x^2}{1 - y^2}}$

B. $-\sqrt{\frac{1 - x^2}{1 - y^2}}$

C. $\sqrt{\frac{1 - y^2}{1 - x^2}}$

D. $-\sqrt{\frac{1 - y^2}{1 - x^2}}$

Answer: C

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335. If $\sqrt{1-x^2}+\sqrt{1-y^2}=a(x-y)$, then $\frac{dy}{dx}$ equals

A. $\dfrac{\sqrt{1-y^2}\left(a\sqrt{1-y^2}-y\right)}{\sqrt{1-x^2}\left(a\sqrt{1-x^2}+x\right)}$

B. $\dfrac{\sqrt{1-x^2}\left(a\sqrt{1-x^2}+x\right)}{\sqrt{1-y^2}\left(a\sqrt{1-y^2}-y\right)}$

C. $\dfrac{\sqrt{1-x^2}\left(a\sqrt{1-y^2}-y\right)}{\sqrt{1-y^2}\left(a\sqrt{1-x^2}+x\right)}$

D. $\dfrac{\sqrt{1-y^2}\left(a\sqrt{1-x^2}+x\right)}{\sqrt{1-x^2}\left(a\sqrt{1-y^2}-y\right)}$

Answer: D

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336. If $y\sqrt{1 - x^2} + x\sqrt{1 - y^2} = 1, then \dfrac{dy}{dx} =$

A. $\sqrt{\dfrac{1 - y^2}{1 - x^2}}$

B. $-\sqrt{\dfrac{1 - y^2}{1 - x^2}}$

C. $\sqrt{\dfrac{1 - x^2}{1 - y^2}}$

D. $-\sqrt{\dfrac{1 - x^2}{1 - y^2}}$

Answer: B

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337. If $x^m . y^n = (x + y)^{m+n}$ then $\dfrac{dy}{dx}$ is:

A. $\dfrac{-y}{x}$

B. $\dfrac{y}{x}$

C. $\dfrac{-x}{y}$

D. $\frac{x}{y}$

Answer: B

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338. $x^5 . y^7 = (x + y)^{12}$

A. $\frac{-x}{y}$

B. $\frac{x}{y}$

C. $\frac{-y}{x}$

D. $\frac{y}{x}$

Answer: D

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339. If $x^4 y^5 = (x + y)^{m+1}$ and $\frac{dy}{dx} = \frac{y}{x}, thenm =$

A. 8

B. 4

C. 5

D. 20

Answer: A

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340. If $x^n y^n = (x+y)^n, then \dfrac{dy}{dx} =$

A. $\dfrac{-1}{(x-1)^2}$

B. $\dfrac{1}{(x-1)^2}$

C. $\dfrac{-x}{(x-1)^2}$

D. $\dfrac{x}{(x-1)^2}$

Answer: A

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341. If $x^n y^n = (x+y)^n, then \frac{dy}{dx} =$

A. $\frac{y^2}{x^2}$

B. $\frac{-y^2}{x^2}$

C. $\frac{x^2}{y^2}$

D. $\frac{-x^2}{y^2}$

Answer: B

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342. If $x^m y^n = (x+y)^{m+n}$, then $\left(\frac{dy}{dx}\right)_{x=1, y=2}$ is equal to

A. $\frac{2m}{n}$

B. $\frac{m}{2n}$

C. 2

D. $\frac{1}{2}$

Answer: C

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343. If $x^3 + x^2y + xy^2 + y^3 = 81, then \frac{dy}{dx} =$

A. $-\left(\frac{3x^2 + 2xy + y^2}{x^2 + 2xy + 3y^2}\right)$

B. $-\frac{x^2 + 2xy + 3y^2}{\left(3x^2 + 2xy + y^2\right)}$

C. $\frac{3x^2 + 2xy + y^2}{x^2 + 2xy + 3y^2}$

D. $\frac{x^2 + 2xy + 3y^2}{3x^2 + 2xy + y^2}$

Answer: A

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344. If $xy = \frac{\pi}{2} then \frac{dy}{dx} =$

A. $\frac{y}{x}$

B. $\frac{-y}{x}$

C. $\frac{x}{y}$

D. $\frac{-x}{y}$

Answer: B

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345. If $x^2y^2 = \tan^{-1}\sqrt{x^2 + y^2} + \cot^{-1}\sqrt{x^2 + y^2}, then \frac{dy}{dx} =$

A. $\frac{-x}{y}$

B. $\frac{x}{y}$

C. $\frac{-y}{x}$

D. $\frac{y}{x}$

Answer: C

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346. If $\cos(xy) = x + y, then \frac{dy}{dx} =$

A. $-\left(\frac{1 + x\sin(xy)}{1 + y\sin(xy)}\right)$

B. $-\left(\frac{1 + y\sin(xy)}{1 + x\sin(xy)}\right)$

C. $\frac{1 + y\sin(xy)}{1 + x\sin(xy)}$

D. $\frac{1 + x\sin(xy)}{1 + y\sin(xy)}$

Answer: B

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347. If $x\sin(a + y) + \sin a\cos(\mathrm{a} + \mathrm{y}) = 0$then (dy)/(dx)

A. $\frac{-\sin a}{\sin^2(a + y)}$

B. $\dfrac{\sin a}{\sin^2(a+y)}$

C. $\dfrac{-\sin^2(a+y)}{\sin a}$

D. $\dfrac{\sin^2(a+y)}{\sin a}$

Answer: D

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348. If $\cos y = x\cos(a+y)$, with $\cos a \neq \pm 1$, prove that $\dfrac{dy}{dx} = \dfrac{\cos^2(a+y)}{\sin a}$.

A. $\dfrac{-\cos(a+y)}{\sin(a+y) - x\sin y}$

B. $\dfrac{\cos(a+y)}{\sin(a+y) - \sin y}$

C. $\dfrac{-\cos(a+y)}{x\sin(a+y) - \sin y}$

D. $\dfrac{\cos(a+y)}{x\sin(a+y) - \sin y}$

Answer: D

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349. If $\cos y = x\cos(a + y)$, with $\cos a \neq \pm 1$, prove that $\frac{dy}{dx} = \frac{\cos^2(a + y)}{\sin a}$.

A. $\frac{\cos^2(a + y)}{\sin a}$

B. $\frac{-\cos^2(a + y)}{\sin a}$

C. $\frac{\sin a}{\cos^2(a + y)}$

D. $\frac{-\sin a}{\cos^2(a + y)}$

Answer: A

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350. If $x\sin y + y\sin x = 0, then \frac{dy}{dx} =$

A. $-\left(\frac{y\cos x + \sin y}{x\cos y + \sin x}\right)$

B. $-\left(\frac{x\cos y + \sin x}{y\cos x + \sin y}\right)$

C. $\frac{x\cos y + \sin x}{y\cos x + \sin y}$

D. $\frac{y\cos x + \sin y}{x\cos y + \sin x}$

Answer: A

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351. If $\sin y = x\sin(a + y), then \frac{dy}{dx}$

A. $\frac{-\sin^2(a + y)}{\sin a}$

B. $\frac{\sin^2(a + y)}{\sin a}$

C. $\frac{-\sin^2(a + y)}{\sin y}$

D. $\frac{\sin^2(a + y)}{\sin y}$

Answer: B

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352. If $\sin y = x\sin(a + y)$, then show that: $\frac{dy}{dx} = \frac{\sin a}{1 - 2x\cos a + x^2}$.

A. $\frac{\sin a}{1 + 2x\cos a + x^2}$

B. $\dfrac{-\sin a}{1 + 2x\cos a + x^2}$

C. $\dfrac{\sin a}{1 - 2x\cos a + x^2}$

D. $\dfrac{-\sin a}{1 - 2x\cos a + x^2}$

Answer: C

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353. If sin^(2) x + cos^(2) y = 1 , " then " (dy)/(dx)` is equal to

A. $\dfrac{\sin 2x}{\sin 2y}$

B. $\dfrac{-\sin 2x}{\sin 2y}$

C. $\dfrac{\sin 2y}{\sin 2x}$

D. $\dfrac{-\sin 2y}{\sin 2x}$

Answer: A

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354. If $\sin(x+y)+\cos(x+y)=1, then \dfrac{dy}{dx}=$

A. -1

B. 1

C. 0

D. 2

Answer: A

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355. If $\sin^2 y+\cos(xy)=\pi, then \dfrac{dy}{dx}=$

A. $\dfrac{-y\sin(xy)}{\sin 2y - x\sin(xy)}$

B. $\dfrac{y\sin(xy)}{\sin 2y - x\sin(xy)}$

C. $\dfrac{-x\sin(xy)}{\sin 2y - x\sin(xy)}$

D. $\dfrac{x\sin(xy)}{\sin 2y - x\sin(xy)}$

Answer: B

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356. If $\cos(xy) = \sin(x+y), then \frac{dy}{dx}$

A. $\frac{\cos(x+y) + y\sin(xy)}{\cos(x+y) + x\sin(xy)}$

B. $-\left(\frac{\cos(x+y) + y\sin(xy)}{\cos(x+y) + x\sin(xy)}\right)$

C. $\frac{\cos(x+y) + x\sin(xy)}{\cos(x+y) + y\sin(xy)}$

D.

Answer: B

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357. If $\sin\left(\frac{x+y}{2}\right) = \sin x + \sin y$ and $\sin\left(\frac{x-y}{2}\right) \neq 0, then \frac{dy}{dx} =$

A. 1

B. -1

C. 2

D. -2

Answer: A

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358. If $ye^x + xe^y = 1, then \frac{dy}{dx} =$

A. $\frac{e^x + xe^y}{e^y + ye^x}$

B. $\frac{e^y + ye^x}{e^x + xe^y}$

C. $-\left(\frac{e^x + xe^y}{e^y + ye^x}\right)$

D. $-\left(\frac{e^y + ye^x}{e^x + xe^y}\right)$

Answer: D

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359. If $xy = e^{(x-y)}$, then find $\frac{dy}{dx}$

A. $\frac{y - e^{x-y}}{x + e^{x-y}}$

B. $\frac{e^{x-y} - y}{e^{x-y} + x}$

C. $\frac{x + e^{x-y}}{y - e^{x-y}}$

D. $\frac{e^{x-y} + x}{e^{x-y} - y}$

Answer: B

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360. If $xy = e^{(x-y)}$, then find $\frac{dy}{dx}$

A. $\frac{x(y + 1)}{y(x - 1)}$

B. $\frac{x(1 + y)}{y(1 - x)}$

C. $\frac{y(x - 1)}{x(y + 1)}$

D. $\frac{y(1 - x)}{x(1 + y)}$

Answer: C

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361. If $y = e^{ax}, then \frac{dy}{dx} =$

A. $-\log y$

B. $\log y$

C. $-y\log y$

D. $y\log y$

Answer: D

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362. If $y = e^{xy}, then \frac{dy}{dx} =$

A. $\dfrac{y(1+xy)}{x(1-xy)}$

B. $\dfrac{-y(1+xy)}{x(1-xy)}$

C. $\dfrac{x(1-xy)}{y(1+xy)}$

D. $\dfrac{-x(1-xy)}{y(1+xy)}$

Answer: A

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363. If $e^{x+y} = \cos(x-y), then \dfrac{dy}{dx} =$

A. $-\left(\dfrac{e^{x+y}+\sin(x-y)}{e^{x+y}-\sin(x-y)}\right)$

B. $-\left(\dfrac{e^{x+y}-\sin(c-y)}{e^{x+y}+\sin(x-y)}\right)$

C. $\dfrac{e^{x+y}+\sin(x-y)}{e^{x+y}-\sin(x-y)}$

D. $\dfrac{e^{x+y}-\sin(x-y)}{e^{x+y}+\sin(x-y)}$

Answer: A

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364. If $\sin y+e^{-x\cos y}=e$, then the value of $\frac{dy}{dx}$ at $(1,\pi)$ is -

A. 0

B. -1

C. $-e$

D. e

Answer: D

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365. If $(x-y)e^{\frac{x}{x-y}}=k, then\frac{dy}{dx}=$

A. $\frac{x-2y}{y}$

B. $\frac{2y-x}{y}$

C. $\frac{2x - y}{y}$

D. $\frac{y - 2x}{y}$

Answer: B

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366. If $e^{2x} + e^{2y} = e^{2(x+y)}$, then $\frac{dy}{dx} =$

A. $e^{2(x+y)}\left(\frac{1 - e^{2y}}{1 - e^{2x}}\right)$

B. $-e^{2(x+y)}\left(\frac{1 - e^{2y}}{1 - e^{2x}}\right)$

C. $e^{2(x-y)}\left(\frac{1 - e^{2y}}{1 - e^{2x}}\right)$

D. $-e^{2(x-y)}\left(\frac{1 - e^{2y}}{1 - e^{2x}}\right)$

Answer: D

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367. If $2^x + 2y = 2^{x+y}$, $then \frac{dy}{dx} =$

A. $-e^{y-x}$

B. e^{y-x}

C. $-e^{x-y}$

D. e^{x-y}

Answer: A

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368. If $e^x + e^y = e^{x+y}$, $then \frac{dy}{dx} =$

A. $e^{x-y}\left(\frac{1-e^y}{1-e^x}\right)$

B. $-e^{x-y}\left(\frac{1-e^y}{1-e^x}\right)$

C. $e^{y-x}\left(\frac{1-e^y}{1-e^x}\right)$

D. $-e^{y-x}\left(\frac{1-e^y}{1-e^x}\right)$

Answer: B

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369. If $2^x+2^y=2^{x+y}$ then $\frac{dy}{dx}$ has the value equal to $-\frac{2^y}{2^x}$ (b) $\frac{1}{1-2^x}$ (c) $1-2^y$ (d) $\frac{2^x\left(1-2^y\right)}{2^y\left(2^x-1\right)}$

A. $2^{x-y}\left(\frac{2^y-1}{2^x-1}\right)$

B. $2^{x-y}\left(\frac{2^y-1}{1-2^x}\right)$

C. $\frac{2^x+2^y}{2^x-2^y}$

D. $\frac{2^x+2^y}{2^y-2^x}$

Answer: B

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370. If $y = 1 + xe^y, \text{ then} \frac{dy}{dx} =$

A. $\frac{e^y}{y - 2}$

B. $\frac{e^y}{2 - y}$

C. $\frac{xe^y}{y - 2}$

D. $\frac{xe^y}{2 - y}$

Answer: B

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371. If $xy = \log(xy), \text{ then} \frac{dy}{dx} =$

A. $\frac{x}{y}$

B. $\frac{-x}{y}$

C. $\frac{y}{x}$

D. $\frac{-y}{x}$

Answer: D

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372. If $\sin(x+y) = \log(x+y)$ then $\frac{dy}{dx} =$

A. -2

B. 2

C. -1

D. 1

Answer: C

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373. If $x^2 + \sin y = y^2 + \log)(x + y), then \frac{dy}{dx} =$

A. $\frac{2x(x + y) - 1}{(x + y)\cos y - 2y(x + y) - 1}$

B. $\frac{(x + y)\cos y - 2y(x + y) - 1}{2x(x + y) - 1}$

C. $\frac{1 - 2x(x + y)}{(x + y)\cos y - 2y(x + y) - 1}$

D. $\frac{(x + y)\cos y - 2y(x + y) - 1}{1 - 2x(x + y)}$

Answer: C

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374. If $\log(x + y) = \log(xy) + a, then \frac{dy}{dx} =$

A. $\frac{y}{x}$

B. $\frac{-y}{x}$

C. $\frac{y^2}{x^2}$

D. $\frac{-y}{x}$

Answer: D

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375. If $e^{x-y} = \log\left(\frac{x}{y}\right)$, $then \frac{dy}{dx} =$

A. $\frac{y}{x}\left(\frac{1 - xe^{x-y}}{1 - ye^{x-y}}\right)$

B. $\frac{-y}{x}\left(\frac{1 - xe^{x-y}}{1 - ye^{x-y}}\right)$

C. $\frac{x}{y}\left(\frac{1 - ye^{x-y}}{1 - xe^{x-y}}\right)$

D. $\frac{-x}{y}\left(\frac{1 - ye^{x-y}}{1 - xe^{x-y}}\right)$

Answer: A

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376. If $x = e^{\tan^{-1}\left(\frac{y - x^2}{x^2}\right)}$ then $\frac{dy}{dx} =$

A. $2x(1 + \tan(\log x)) - x\sec^2(\log x)$

B. $2x(1 + \tan(\log x)) + x\sec^2(\log x)$

C. $2x(1 + \tan(\log x)) - x^2\sec^2(\log x)$

D. $2x(1 + \tan(\log x)) + x^2\sec^2(\log x)$

Answer: B

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377. If $x^y = e^{x - y}$; then $\frac{dy}{dx}$ is

A. $\frac{x - y}{x\log(ex)}$

B. $\frac{y - x}{x\log(ex)}$

C. $\frac{x - y}{x\log x}$

D. $\frac{y - x}{x\log x}$

Answer: A

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378. If $x^y = e^{x-y}$; then $\frac{dy}{dx}$ is

A. $\frac{1+x}{1+\log x}$

B. $\frac{\log x}{(1+\log x)^2}$

C. $\frac{1-\log x}{1+\log x}$

D. $\frac{1-x}{(1+\log x)}$

Answer: B

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379. If $x^y = 3^{x-y}, then \frac{dy}{dx} =$

A. $\frac{x\log 3 - y}{x\log(3x)}$

B. $\dfrac{y - x\log 3}{x\log(3x)}$

C. $\dfrac{x\log 3 - y}{x\log(3 + x)}$

D. $\dfrac{y - x\log 3}{x\log(3 + x)}$

Answer: A

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380. If $y^y = x\sin y, \ then \dfrac{dy}{dx} =$

A. $\dfrac{1}{x(1 + \log y - \tan y)}$

B. $\dfrac{-1}{x(1 + \log y - \tan y)}$

C. $\dfrac{1}{x(1 + \log y - \cot y)}$

D. $\dfrac{-1}{x(1 + \log y - \cot y)}$

Answer: C

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381. If $x^y = y^x$ then $\dfrac{dy}{dx} = ?$

A. $\dfrac{-y(x\log y - y)}{x(y\log x - x)}$

B. $\dfrac{-x(y\log x - x)}{y(x\log y - y)}$

C. $\dfrac{y(x\log y - y)}{x(y\log x - x)}$

D. $\dfrac{x(y\log x - x)}{y(x\log y - y)}$

Answer: C

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382. If $x^y y^x = (x+y)^{x+y}$. then $\dfrac{dy}{dx} =$

A. $-\left(\dfrac{y + x\log y - x(1 + \log(x+y))}{x + y\log x - y(1 + \log(x+y))}\right)$

B. $\dfrac{y + x\log y - x(1 + \log(x+y))}{x + y\log x - y(1 + \log(x+y))}$

C. $\left(\dfrac{y}{x}\right)\dfrac{-y - x\log y + x(1 + \log(x+y))}{x + y\log x - y(1 + \log(x+y))}$

D. $\left(\dfrac{y}{x}\right)\dfrac{y + x\log y - x(1 + \log(x+y))}{x + y\log x - y(1 + \log(x+y))}$

Answer: C

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383. If $\sec\left(\frac{x+y}{x-y}\right)=a^2, then \frac{dy}{dx}=$

A. $\frac{x}{y}$

B. $\frac{-x}{y}$

C. $\frac{y}{x}$

D. $\frac{-y}{x}$

Answer: C

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384. If $\cos^{-1}\left(\frac{x^2-y^2}{x^2+y^2}\right)=a, then \frac{dy}{dx}=$

A. $\frac{x}{y}$

B. $\frac{-x}{y}$

C. $\frac{y}{x}$

D. $\frac{-y}{x}$

Answer: C

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385. If $\cos^{-1}\left(\frac{x^2-y^2}{x^2+y^2}\right)=\tan^{-1}a$, prove than $\frac{dy}{dx}=\frac{y}{x}$.

A. $\frac{y^2}{x^2}$

B. $\frac{x^2}{y^2}$

C. $\frac{y}{x}$

D. $\frac{x}{y}$

Answer: C

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386. If $\cos^{-1}\left(\frac{x^2 - y^2}{x^2 + y^2}\right) = a, then \frac{dy}{dx} =$

A. $2x\tan k$

B. $x\tan k$

C. $2x\tan^2 k$

D. $x\tan^2 k$

Answer: D

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387. If $\tan^{-1}\left(\frac{x^2 - 2y^2}{x^2 + 2y^2}\right) = a$, show that $\frac{dy}{dx} = \frac{x(1 - \tan a)}{2y(1 + \tan a)}$

A. $\frac{x(1 - \tan a)}{2y(1 + \tan a)}$

B. $\frac{x(1 + \tan a)}{2y(1 - \tan a)}$

C. $\dfrac{x(1 - \tan a)}{y(1 + \tan a)}$

D. $\dfrac{x(1 + \tan a)}{y(1 - \tan a)}$

Answer: A

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388. If $\log_{10}\left(\dfrac{x^2 - y^2}{x^2 + y^2}\right) = 2, \text{ then} \dfrac{dy}{dx}$ is equal to

A. $\dfrac{-99x}{101y}$

B. $\dfrac{99x}{101y}$

C. $\dfrac{-99y}{101x}$

D. $\dfrac{99y}{101x}$

Answer: A

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389. IF $\log_{10}\left(\frac{x^3 - y^3}{x^3 + y^3}\right) = 2$ then $\frac{dy}{dx} =$

A. $\frac{-101y^2}{99x^2}$

B. $\frac{101y^2}{99x^2}$

C. $\frac{-99x^2}{101y^2}$

D. $\frac{99x^2}{101y^2}$

Answer: C

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390. If $y = \sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin x + \dots \to \infty}}}$, prove that $\frac{dy}{dx} = \frac{\cos x}{2y - 1}$

A. $\frac{\cos x}{1 - 2y}$

B. $\frac{\cos x}{2y - 1}$

C. $\frac{2\cos x}{1 - 2y}$

D. $\frac{2\cos x}{2y - 1}$

Answer: B

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391. If $y = \sqrt{\log x + \sqrt{\log x + \sqrt{\log x} + \ldots\ldots\infty}}$, then $\dfrac{dy}{dx}$ is

A. $\dfrac{x}{1 - 2y}$

B. $\dfrac{x}{2y - 1}$

C. $\dfrac{1}{x(1 - 2y)}$

D. $\dfrac{1}{x(2y - 1)}$

Answer: D

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392. If $x = e^{y + e^{y + \ldots . \infty}}, x > 0, then \dfrac{dy}{dx} =$

A. $\dfrac{1 + x}{x}$

B. $\frac{1-x}{x}$

C. $\frac{1}{x}$

D. $\frac{x}{1+x}$

Answer: B

Watch Video Solution

393. If $y = e^{x+e^{x+e^{x+\dots\infty}}}$, then $\frac{dy}{dx} =$

A. $\frac{y}{1-y}$

B. $\frac{1}{1-y}$

C. $\frac{y}{1+y}$

D. $\frac{y}{y-1}$

Answer: A

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394. If $y = x^2 + \cfrac{1}{x^2 + \cfrac{1}{x^2 + \dots \infty}}$, then $\frac{dy}{dx} =$

A. $\frac{-xy^2}{y^2 + 1}$

B. $\frac{xy^2}{y^2 + 1}$

C. $\frac{-2xy^2}{y^2 + 1}$

D. $\frac{2xy^2}{y^2 + 1}$

Answer: D

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395. If $y = \cfrac{\sin x}{1 + \cfrac{\cos x}{\cfrac{\sin x}{1 + \dots . \infty}}}$, then $\frac{dy}{dx} =$

A. $\frac{(1 + y)\cos x + y\sin x}{1 + 2y + \cos x - \sin x}$

B. $\frac{(1 + y)(\cos x - y\sin x)}{1 + 2y + \cos x - \sin x}$

C. $\frac{(1 + y)\cos x + y\sin x}{1 + 2y + \cos x + \sin x}$

D. $\frac{(1+y)\cos x - y\sin x}{1+2y+\cos x+\sin x}$

Answer: A

View Text Solution

396. If $x = 4t, y = \frac{4}{t}, then \frac{dy}{dx} =$

A. $\frac{4}{x}$

B. $\frac{-4}{x}$

C. $\frac{16}{x^2}$

D. $\frac{-16}{x^2}$

Answer: D

Watch Video Solution

397. If $x = a\left(t - \frac{1}{t}\right), y = a\left(t + \frac{1}{t}\right)$, where t be the parameter, then $\frac{dy}{dx} = ?$

A. $\frac{y}{x}$

B. $\frac{-x}{y}$

C. $\frac{x}{y}$

D. $\frac{-y}{x}$

Answer: C

Watch Video Solution

398. If $x = at^2, y = at, then \frac{dy}{dx} =$

A. $\frac{a}{t}$

B. $\frac{1}{2t}$

C. at

D. t

Answer: B

Watch Video Solution

399. If $x = 2at^2, y = at^4, then \frac{dy}{dx} =$

A. t^2

B. $2t^2$

C. $\frac{1}{t^2}$

D. $\frac{1}{2t^2}$

Answer: A

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400. If $x = a\left(\frac{1 - t^2}{1 + t^2}\right), y = \frac{2bt}{1 + t^2}, then \frac{dy}{dx} =$

A. $\frac{x}{y}$

B. $\frac{-x}{y}$

C. $\frac{b^2x}{a^2y}$

D. $\frac{-b^2x}{a^2y}$

Answer: D

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401. If $x = \frac{2t}{1+t^2}, y = \frac{1-t^2}{1+t^2}, then f \in d\frac{dy}{dx}a = 2.$

A. $\frac{2t}{t^2-1}$

B. $\frac{2t}{1-t^2}$

C. $\frac{b^2x}{a^2y}$

D. $\frac{-b^2x}{a^2y}$

Answer: A

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402. If$x^2 + y^2 = t - \frac{1}{t}$ and $x^4 + y^4 = t^2 + \frac{1}{t^2}, then\frac{dy}{dx} =$

A. x^3y

B. $-x^3y$

C. $\frac{1}{x^3y}$

D. $\frac{-1}{x^3y}$

Answer: C

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403. if $x^2 + y^2 = t - \frac{1}{t}$ and $x^4 + y^4 = t^2 + \frac{1}{t^2}$ then prove that $\frac{dy}{dx} = \frac{1}{x^3y}$

A. $\frac{y}{x}$

B. $\frac{-y}{x}$

C. $\frac{x}{y}$

D. $\frac{-x}{y}$

Answer: B

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404. If $x = a\cos\theta, y = a\sin\theta, then \frac{dy}{dx} =$

A. x^3y

B. $-\tan\theta$

C. $\cot\theta$

D. $-\cot\theta$

Answer: D

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405. If $x\sin t, y = \cos 2t, then \frac{dy}{dx} =$

A. $4\sin t$

B. $-4\sin t$

C. $2\sin t$

D. $-2\sin t$

Answer: B

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406. If $x = a\cot\theta, y = b\mathrm{cosec}\theta, then \frac{dy}{dx} =$

A. $\frac{-b}{a}\cos\theta$

B. $\frac{b}{a}\cos\theta$

C. $\frac{-a}{b}\cos\theta$

D. $\frac{a}{b}\cos\theta$

Answer: B

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407. If $x = a\sec\theta, y = b\tan\theta$ then $\frac{dy}{dx} = ?$

A. $\frac{b}{a}\sin\theta$

B. $\frac{b}{a}\mathrm{cos}ec\theta$

C. $\frac{a}{b}\cos\theta$

D. $\frac{a}{b}\sec\theta$

Answer: B

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408. If $x = a\sec\theta, y = a\tan\theta, \textit{then}\ \text{ at}\theta = \frac{\pi}{4}, \frac{dy}{dx} =$

A. $\sqrt{2}$

B. 2

C. $\frac{1}{\sqrt{2}}$

D. $\frac{1}{2}$

Answer: A

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409. If $x = a\cos^3 t y = a\sin^3 t$ then $\frac{dy}{dx} =$

A. $-3\sqrt{\frac{y}{x}}$

B. $2\sqrt{\frac{y}{x}}$

C. $-3\sqrt{\frac{x}{y}}$

D. $3\sqrt{\frac{x}{y}}$

Answer: A

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410. If x = $a\cos^3\theta, y = a\sin^3\theta then \sqrt{1 + \left(\frac{dy}{dx}\right)^2}$ =?

A. $|\tan\theta|$

B. $|\sec\theta|$

C. $\tan\theta$

D. $\sec\theta$

Answer: B

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411. If $x = a\cos^3 t, y = a\sin^3 t, \text{ then } \text{at } t = \frac{\pi}{3}, \frac{dy}{dx} =$

A. $-\sqrt{3}$

B. $\sqrt{3}$

C. $\frac{-1}{\sqrt{3}}$

D. $\frac{1}{\sqrt{3}}$

Answer: A

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412. If $x = a\sec^3\theta and y = a\tan^3\theta, f \in d\frac{dy}{dx}ah\eta = \frac{\pi}{3}$·

A. $\frac{-\sqrt{3}}{2}$

B. $\frac{\sqrt{3}}{2}$

C. $\frac{-1}{2}$

D. $\frac{1}{2}$

Answer: B

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413. If $x = \sec^2\theta, y = \tan^3\theta, then$ at $\theta\frac{\pi}{3}, \frac{dy}{dx} =$

A. $\frac{-3\sqrt{3}}{2}$

B. $\frac{3\sqrt{3}}{2}$

C. $\frac{-1}{2\sqrt{3}}$

D. $\frac{1}{2\sqrt{3}}$

Answer: B

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414. If $x = 3\tan\theta, y = 3\mathrm{cosec}\theta, then$ at $\theta = \frac{\pi}{6}, \frac{dy}{dx} =$

A. $\frac{-3\sqrt{3}}{2}$

B. $\frac{3\sqrt{3}}{2}$

C. $\frac{-3}{2}$

D. $\frac{3}{2}$

Answer: A

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415. If $x = 2\cos^4(t+3), y = 3\sin^4(t+3), then \frac{dy}{dx} =$

A. $\sqrt{\frac{2x}{3y}}$

B. $-\sqrt{\frac{2x}{3y}}$

C. $\sqrt{\frac{3y}{2x}}$

D. $-\sqrt{\frac{3y}{2x}}$

Answer: D

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416. if $x = a\cos^4\theta, y = a\sin^4\theta$, then $\frac{dy}{dx}$ at $\theta = \frac{3\pi}{4}$ is

A. a^2

B. $-a^2$

C. 1

D. -1

Answer: D

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417. If $x = \sin t \cos 2t, y = \cos t \sin 2t$, *then* at $t = \frac{\pi}{4}, \frac{dy}{dx}$

A. $\frac{-1}{2}$

B. $\frac{1}{2}$

C. -2

D. 2

Answer: B

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418. If $y = 1 - \cos\theta, x = 1 - \sin\theta$, *then* $\frac{dy}{dx}$ at $\theta = \frac{\pi}{4}$ *is*

A. -1

B. 1

C. $\frac{1}{2}$

D. $\frac{1}{\sqrt{2}}$

Answer: A

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419. If $x = \theta - \sin\theta, y = 1 - \cos\theta, then$ at $\theta = \frac{\pi}{2}, \frac{dy}{dx} =$

A. $\frac{-1}{2}$

B. $\frac{1}{2}$

C. -1

D. 1

Answer: D

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420. If $x = a(\theta - \sin\theta), y = a(1 - \cos\theta), then \frac{dy}{dx} =$

A. $-\tan\left(\frac{\theta}{2}\right)$

B. $\tan\left(\frac{\theta}{2}\right)$

C. $-\cot\left(\frac{\theta}{2}\right)$

D. $\cot\left(\frac{\theta}{2}\right)$

Answer: D

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421. If $x = a\sqrt{\sec\theta - \tan\theta}, y = a\sqrt{\sec\theta + \tan\theta}, then \frac{dy}{dx} =$

A. $\frac{y}{x}$

B. $\frac{-y}{x}$

C. $\frac{x}{y}$

D. $\frac{-x}{y}$

Answer: B

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422. If $x = 3\cos t - 2\cos^3 t, y = 3\sin t - 2\sin^3 t, then \frac{dy}{dx} =$

A. $\cot t$

B. $-\cot t$

C. $\tan t$

D. $-\tan t$

Answer: A

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423. If $x = 3\cos\theta - 2\cos^3\theta, y = 3\sin\theta - 2\sin^3\theta, then \text{ at } \theta = \frac{\pi}{4}, \frac{dy}{dx}$

A. $\sqrt{2}$

B. 2

C. 1

D. -1

Answer: C

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424. If $x = 2\cos t + \cos 2t, y = 2\sin t - \sin 2t, then$ at $t = \frac{\pi}{4}, \frac{dy}{dx}$

A. $1 + \sqrt{2}$

B. $-1 - \sqrt{2}$

C. $\sqrt{2} - 1$

D. $1 - \sqrt{2}$

Answer: D

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425. If $x = 2\cos\theta - \cos 2\theta, y = 2\sin\theta - \sin 2\theta, then \frac{dy}{dx} =$

A. $\tan\left(\frac{\theta}{2}\right)$

B. $-\tan\left(\frac{\theta}{2}\right)$

C. $\tan\left(\frac{3\theta}{2}\right)$

D. $-\tan\left(\frac{3\theta}{2}\right)$

Answer: C

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426. यदि $x = a\sin 2\theta(1 + \cos 2\theta), y = b\cos 2\theta(1 - \cos 2\theta)$, तब $dy/dx =$

A. $\frac{b}{a\tan\theta}$

B. $\frac{a\tan\theta}{b}$

C. $\frac{a}{b\tan\theta}$

D. $\frac{b\tan\theta}{a}$

Answer: D

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427. If $x = a(t\cos t - \sin t), y = a(t\sin t + \cos t), then \frac{dy}{dx} =$

A. $-\tan t$

B. $\tan t$

C. $-\cot t$

D. $\cot t$

Answer: C

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428. If $x = \frac{\sin^3 t}{\sqrt{\cos 2t}}, y = \frac{\cos^3 t}{\sqrt{\cos 2t}}$ show that $\frac{dy}{dx} = 0 at t = \frac{\pi}{6}$

A. $\tan 3t$

B. $-\tan 3t$

C. $\cot 3t$

D. $-\cot 3t$

Answer: D

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429. If $x = a(\cos\theta + \theta\sin\theta), y = a(\sin\theta - \theta\cos\theta), then \dfrac{dy}{dx} =$

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430. If $x = \sin(\log t), y = \log(\sin t), then \dfrac{dy}{dx} =$

A. $\dfrac{t\cot t}{\cos(\log t)}$

B. $\dfrac{-t\cot t}{\cos(\log t)}$

C. $\dfrac{t\tan t}{\cos(\log t)}$

D. $\dfrac{-t\tan t}{\cos(\log t)}$

Answer: A

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431. If $x = \cos(\log t), y\log(\cos t), then \frac{dy}{dx} =$

A. $\frac{-t\cos t}{\sin(\log t)}$

B. $\frac{t\cot t}{\sin(\log t)}$

C. $\frac{-t\tan t}{\sin(\log t)}$

D. $\frac{t\tan t}{\sin(\log t)}$

Answer: D

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432. If $x = \cos\theta, y = \log\left(\tan\left(\frac{\theta}{2}\right)\right), then \frac{dy}{dx} =$

A. $\sin^2\theta$

B. $-\sin^2\theta$

C. $\operatorname{cosec}^2\theta$

D. $-\operatorname{cosec}^2\theta$

Answer: D

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433. If $x = \sin\sqrt{t}, y = e^{\sqrt{t}}, \textit{then} \frac{dy}{dx} =$

A. $\frac{e^{\sqrt{t}}}{\cos\sqrt{t}}$

B. $\frac{-e^{\sqrt{t}}}{\cos\sqrt{t}}$

C. $\frac{2e^{\sqrt{t}}}{\cos\sqrt{t}}$

D. $\frac{-2e^{\sqrt{t}}}{\cos\sqrt{t}}$

Answer: A

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434. Derivative of $\log(\sec\theta + \tan\theta)$ with respect top $\sec\theta$ at

$\theta = \frac{\pi}{4}$ is

A. 0

B. 1

C. $\frac{1}{\sqrt{2}}$

D. $\frac{1}{2}$

Answer: B

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435. If $x = a\left(\cos t + \log\left(\tan\left(\frac{t}{2}\right)\right)\right), y = a\sin t, then \frac{dy}{dx} =$

A. $\tan t$

B. $-\tan t$

C. $\cot t$

D. $-\cot t$

Answer: A

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436. If $x = \frac{e^m + e^{-m}}{2}, y = \frac{e^m - e^{-m}}{2}, then \frac{dy}{dx} =$

A. $\frac{-y}{x}$

B. $\frac{y}{x}$

C. $\frac{-x}{y}$

D. $\frac{x}{y}$

Answer: D

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437. If $x = e^{\sin 3t}, y = e^{\cos, 3t}, then \frac{dy}{dx} =$

A. $\frac{-y}{x}\tan 2t$

B. $\frac{y}{x}\tan 2t$

C. $\frac{-y}{x}\cot 2t$

D. $\frac{y}{x}\cot 2t$

Answer: C

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438. If $x = e^{\sin 3t}y = e^{\cos, 3t}, then \frac{dy}{dx} =$

A. $\frac{y\log x}{x\log y}$

B. $\frac{-y\log x}{x\log y}$

C. $\frac{x\log y}{y\log x}$

D. $\frac{-x\log y}{y\log x}$

Answer: B

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439. If $x = \left(t + \frac{1}{t}\right)^{a}, y = a^{t + \frac{1}{t}}, \text{find} \frac{dy}{dx}$

A. $\dfrac{a^{\left(t + \frac{1}{t}\right)}(\log a)}{\left(t + \frac{1}{t}\right)^{a-1}}$

B. $\dfrac{a\left(t + \frac{1}{t}\right)(\log a)}{\left(t + \frac{1}{t}\right)^{1-a}}$

C. $\dfrac{a^{\left(t + \frac{1}{t} - 1\right)}(\log a)}{\left(t + \frac{1}{t}\right)^{(a-1)}}$

D. $\dfrac{a^{t + \frac{1}{t} - 1}(\log a)}{\left(t + \frac{1}{t}\right)^{(1-a)}}$

Answer: C

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440. If $x = \sqrt{a^{\sin^{-1}t}}, y = \sqrt{a^{\cos^{-1}t}}$ then show that, $\frac{dy}{dx} = -\frac{y}{x}$.

A. $\frac{-x}{y}$

B. $\frac{x}{y}$

C. $\frac{-y}{x}$

D. $\frac{y}{x}$

Answer: C

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441. If $x = e^{\theta}(\sin\theta - \cos\theta), y = e^{\theta}(\sin\theta + \cos\theta)$ then $\frac{dy}{dx}$ at $\theta = \frac{\pi}{4}$ is

A. -1

B. 1

C. -2

D. 2

Answer: B

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442. If $u = e^{\log\cos 4x}, v = e^{\log\sin 4x}, then \frac{dv}{du} =$

A. $\frac{v}{u}$

B. $\frac{-v}{u}$

C. $\frac{u}{v}$

D. $\frac{-u}{v}$

Answer: D

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443. If $x = t\log t, y = t^t, then \frac{dy}{dx} =$

A. $-e^{-x}$

B. e^{-x}

C. $-e^{x}$

D. y

Answer: D

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444. If $x = \sqrt{1 + u^2}, y = \log\left(1 + u^2\right), then \dfrac{dy}{dx} =$

A. $\dfrac{x}{2}$

B. $\dfrac{x}{4}$

C. $\dfrac{4}{x}$

D. $\dfrac{2}{x}$

Answer: D

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445. If $x = \log\left(1 + t^2\right)$ and $y = t - \tan^{-1}t$, then $\frac{dy}{dx}$ is equal to

A. $2\sqrt{e^x - 1}$

B. $2\sqrt{1 - e^x}$

C. $\frac{\sqrt{e^x - 1}}{2}$

D. $\frac{\sqrt{1 - e^x}}{2}$

Answer: C

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446. If $u = \log\left(1 + x^2\right)$ and $v = x - \tan^{-1}x$, then $\frac{dy}{dx} =$

A. $\frac{2}{x}$

B. $\frac{-2}{x}$

C. $\frac{x}{2}$

D. $\frac{-x}{2}$

Answer: C

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447. If $x = \frac{1 + \log t}{t^2}, y = \frac{3 + 2\log t}{t}, \text{find} \frac{dy}{dx}\cdot$

A. 0

B. 2

C. -1

D. 1

Answer: D

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448. If $x = \sin^{-1}\left(\frac{t}{\sqrt{1 + t^2}}\right), y = \cos^{-1}\left(\frac{1}{\sqrt{1 + t^2}}\right)$, show that $\frac{dy}{dx} = 1$

A. 1

B. `-1

C. 2

D. -2

Answer: A

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449. $x = \sin^{-1}\left(\frac{2\theta}{1+\theta^2}\right), y = \sec^{-1}\left(\sqrt{1+\theta^2}\right)$

A. $\frac{-1}{2}$

B. $\frac{1}{2}$

C. -2

D. 2

Answer: B

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450. If $x = \cos^{-1}\left(4t^3 - 3t\right), y = \tan^{-1}\left(\frac{\sqrt{1 - t^2}}{t}\right), then \frac{dy}{dx} =$

A. $\frac{1}{3}$

B. $\frac{-1}{3}$

C. 3

D. -3

Answer: A

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451. If $x = \tan\left(\frac{1}{2}\sin^{-1}\left(\frac{2t}{1 + t^2}\right) + \frac{1}{2}\cos^{-1}\left(\frac{1 - t^2}{1 + t^2}\right)\right)$, then $y = \frac{2t}{1 - t^2}$, then $\frac{dy}{dx} =$

A. -2

B. 2

C. 1

D. -1

Answer: C

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452. If $f(x) = \tan^{-1} x, \textit{then}$ derivative of $f(\tan x)$w.r.t.$f(\cot x)$ is

A. -1

B. 1

C. $\frac{-1}{2}$

D. $\frac{1}{2}$

Answer: A

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453. If $f'(1) = -2\sqrt{2} and g'(\sqrt{2}) = 4$, then the derivative of $f(\tan x)$ with respect to $g(\sec x)$ at $x = \frac{\pi}{4}$, is 1 (b) -1 (c) 2 (d) 4

A. $2\sqrt{2}$

B. $\sqrt{2}$

C. $\frac{1}{2\sqrt{2}}$

D. $\frac{1}{\sqrt{2}}$

Answer: D

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454. If $f'\left(\frac{1}{2}\right) = 2, g'\left(\frac{\sqrt{3}}{2}\right) = 2$ then derivates of $f(\cos x)$, w.r.t. $g(\sin x)$at $x = \frac{\pi}{3}$ is

A. $\sqrt{3}$

B. $-\sqrt{3}$

C. $2\sqrt{3}$

D. $-2\sqrt{3}$

Answer: B

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455. If $y = x - x^2$, then the derivative of y^2 w.r.t x^2 is

A. $x(x - 1)(1 - 2x)$

B. $x(1 - x)(1 - 2x)$

C. $(x - 1)(1 - 2x)$

D. $(1 - x)(1 - 2x)$

Answer: D

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456. Darivative of sin x w.r.t. cos x is

A. $\cot x$

B. $-\cot x$

C. $\tan x$

D. $-\tan x$

Answer: B

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457. $e^x \cos x$ w.r.t.$e^x \sin x$

A. $-\tan\left(\frac{\pi}{4}+x\right)$

B. $\tan\left(\frac{\pi}{4}+x\right)$

C. $\tan\left(\frac{\pi}{4}-x\right)$

D. $-\tan\left(\frac{\pi}{4}-x\right)$

Answer: C

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458. Derivative $e^x \cos x$ w.r.t. $e^x \sin x$, at $x = 0$ is

A. -1

B. 1

C. 0

D. e

Answer: B

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459. $e^x \cos$ x w.r.t.$e^x \sin x$

A. $\frac{2\cos x - \sin x}{2\sin x + \cos x}$

B. $\dfrac{\sin x - 2\cos x}{\cos x + 2\sin x}$

C. $\dfrac{2\sin x + \cos x}{2\cos x - \sin x}$

D. $\dfrac{\cos x + 2\sin x}{\sin x - 2\cos x}$

Answer: A

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460. Derivative $5^x w.r.t. \log_5 x$ is

A. $5^x(\log 5)$

B. $x5^x(\log 5)$

C. $5^x(\log 5)^2$

D. $x5^x(\log 5)^2$

Answer: D

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461. Differential coefficient of $\log_{10}x w.r.t \log_x 10$ is

A. $-\left(\log_{10}x\right)^2$

B. $\left(\log_{10}x\right)^2$

C. $-\left(\log_x 10\right)^2$

D. $\left(\log_x 10\right)^2$

Answer: A

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462. $\log\left(1 + x^2\right)$w.r.t.$\tan^{-1}x$

A. x

B. $2x$

C. $\frac{1}{2x}$

D. $\frac{2}{x}$

Answer: B

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463. Darivative of $\tan^{-1}(\log t) w.r.t \log\left(\sec^{-1}t\right)$ is

A. $\dfrac{\sqrt{1-t^2}\sec^{-1}t}{1+(\log t)^2}$

B. $\dfrac{-\sqrt{1-t^2}\sec^{-1}t}{1+(\log t)^2}$

C. $\dfrac{\sqrt{t^2-1}\sec^{-1}t}{1+(\log t)^2}$

D. $\dfrac{-\sqrt{t^2-1}\sec^{-1}t}{1+(\log t)^2}$

Answer: C

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464. Derivative of x^x w.r.t $x\log x$ is

A. $1 + \log x$

B. $x^x + \log x$

C. x^x

D. $x^x - \log x$

Answer: C

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465. Derivative of $(\log x)^x w.r.t \log x$ is

A. $(\log x)^x \left(\log(\log x) + \dfrac{1}{\log x} \right)$

B. $(\log x)^x \left(\log(\log x) + \dfrac{1}{x \log x} \right)$

C. $x(\log x)^x \left(\log(\log x) + \dfrac{1}{\log x} \right)$

D. $x(\log x)^x \left(\log(\log x) + \dfrac{1}{x \log x} \right)$

Answer: C

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466. Differentiate $(\cos x)^{\sin x}$ w.r.t $(\sin x)^{\cos x}$

A. $\dfrac{(\sin x)^{\cos x}(\cos x\cot x - \sin x\log(\sin x))}{(\cos x)^{\sin x}(\cos x\log(\cos x) - \sin x\tan x)}$

B. $\dfrac{-(\sin x)^{\cos x}(\cos x\cot x - \sin x\log(\sin x))}{(\cos x)^{\sin x}(\cos x\log(\cos x) - \sin x\tan x)}$

C. $\dfrac{(\cos x)^{\sin x}(\cos x\log(\cos x) - \sin x\tan x)}{-(\sin x)^{\cos x}(\cos x\cot x - \sin x\log(\sin x))}$

D. $\dfrac{-(\cos x)^{\sin x}(\cos x\log(\cos x) - \sin x\tan x)}{(\sin x)^{\cos x}(\cos x\cot x - \sin x\log(\sin x))}$

Answer: C

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467. $\cos^{-1}(\sin x) w.r.t. \tan^{-1} x$

A. $-\left(1 + x^2\right)$

B. $1 + x^2$

C. $\dfrac{-1}{1 + x^2}$

D. $\frac{1}{1+x^2}$

Answer: A

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468. $\tan^{-1}\left(\frac{x}{\sqrt{1-x^2}}\right)$ w.r.t. $\sec^{-1}\left(\frac{1}{2x^2-1}\right)$

A. $\frac{1}{2}$

B. $\frac{-1}{2}$

C. 2

D. -2

Answer: B

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469. Darivative of $\tan^{-1}\left(\frac{x}{\sqrt{1-x^2}}\right) w.r.t. \sin^{-1}\left(3x-4x^3\right)$ is

A. $\frac{1}{\sqrt{1-x^2}}$

B. $\frac{3}{\sqrt{1-x^2}}$

C. 3

D. $\frac{1}{3}$

Answer: D

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470. Differential coefficient of $\tan^{-1}\sqrt{\frac{1-x^2}{1+x^2}}$ w.r.t. $\cos^{-1}\left(x^2\right)$ is equal to.....

A. $\frac{-1}{2}$

B. $\frac{1}{2}$

C. 1

D. 0

Answer: B

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471. [" (v) Differentiate "log[(sqrt(1+x^(2))+x)/(sqrt(1+x^(2))-x)]" w.r.t."], [cos(log x)]

A. $\dfrac{x}{\sqrt{1+x^2}\sin(\log x)}$

B. $\dfrac{-x}{\sqrt{1+x^2}\sin(\log x)}$

C. $\dfrac{2x}{\sqrt{1+x^2}\sin(\log x)}$

D. $\dfrac{-2x}{\sqrt{1+x^2}\sin(\log x)}$

Answer: D

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472. Derivative of $\tan^{-1}\left(\frac{a-x}{1+ax}\right) w.r.t. \sin^{-1}\left(3x-4x^3\right)$ is

A. $\frac{-3\left(1+x^2\right)}{\sqrt{1+x^2}}$

B. $\frac{3\left(1+x^2\right)}{\sqrt{1+x^2}}$

C. $\frac{-\sqrt{1-x^2}}{3\left(1+x^2\right)}$

D. $\frac{\sqrt{1-x^2}}{3\left(1+x^2\right)}$

Answer: C

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473. Derivative of $\tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right) w.r.t. \tan^{-1}\left(\frac{2x\sqrt{1-x^2}}{1-2x^2}\right)$ is

A. $\dfrac{-\sqrt{1-x^2}}{4\left(1+x^2\right)}$

B. $\dfrac{\sqrt{1-x^2}}{4\left(1+x^2\right)}$

C. $\dfrac{-\sqrt{1-x^2}}{1+x^2}$

D. $\dfrac{\sqrt{1-x^2}}{1+x^2}$

Answer: B

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474. Derivative of $\tan^{-1}\left(\dfrac{\sqrt{1+x^2}-1}{x}\right) w.r.\cos^{-1}\sqrt{\dfrac{1+\sqrt{1+x^2}}{2\sqrt{1+x^2}}}$ is

A. 1

B. -1

C. 2

D. -2

Answer: A

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475. Find the differential coefficient of :

$$\frac{\tan^{-1}x}{1+\tan^{-1}x} \text{ w.r.t. } \tan^{-1}x$$

A. $\dfrac{-1}{2\left(1+\tan^{-1}x\right)^2}$

B. $\dfrac{1}{\left(1+\tan^{-1}x\right)^2}$

C. $\dfrac{-1}{1+\tan^{-1}x}$

D. $\dfrac{1}{1+\tan^{-1}x}$

Answer: B

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476. If $x^2+6xy+y^2=10$, Show that $\dfrac{d^2y}{dx^2}=\dfrac{80}{(3x+y)^3}$.

A. $\dfrac{-40}{(3x+y)^3}$

B. $\dfrac{40}{(3x+y)^3}$

C. $\dfrac{-80}{(3x+y)^3}$

D. $\dfrac{80}{(3x+y)^3}$

Answer: D

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477. If $y = x^3 + 5x^2 - 3x + 10, then \dfrac{d^2y}{dx^2} =$

A. $3x^2 + 10x$

B. $3x^2 + 5x$

C. $3x + 5$

D. $6x + 10$

Answer: D

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478. If $ax^2 + 2hxy + by^2 = 0$, show that $\dfrac{d^2y}{dx^2} = 0$

A. 0

B. 1

C. $\dfrac{y}{x}$

D. $\dfrac{x}{y}$

Answer: A

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479. If $ax^2 + 2hxy + by^2 = 1$, *then* $\dfrac{d^2y}{dx^2}$ is $\dfrac{h^2 - ab}{(hx + by)^2}$ (b) $\dfrac{ab - h^2}{(hx + by)^2}$ $\dfrac{h^2 + ab}{(hx + by)^2}$

(d) none of these

A. $-\left(h^2 + ab\right)$

B. $-\left(h^2 - ab\right)$

C. $h^2 + ab$

D. $h^2 - ab$

Answer: D

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480. If $x^m y^n = (x+y)^{m+n}$, prove that $\frac{d^2y}{dx^2} = 0.$

A. 0

B. m

C. n

D. mn

Answer: A

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481. If $y = ax^{n+1} + bx^{-n}$, then $x^2 \frac{d^2y}{dx^2} = n(n - 1)y$ (b) $n(n + 1)y$ (c) ny (d) n^2y

A. ny

B. n^2y

C. $n(n + 1)y$

D. $n(n - 1)y$

Answer: C

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482. If $y^2 = ax^2 + bx + c$, then $y^3 \frac{d^2y}{dx^2}$ is (a) a constant (b) a function of x only (c) a function of y only (d) a function of x and y

A. a function of x and y

B. a function of y only

C. a function of x only

D. a constant

Answer: D

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483. if $(x - a)^2 + (y - b)^2 = c^2$ then $\dfrac{1 + \left(\dfrac{dy}{dx}\right)^2}{\dfrac{d^2y}{dx^2}} = ?$

A. a constant

B. dependent of a and b

C. a constant, independent of a and b

D. dependent of a, b and c

Answer: C

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484. If $f(x) = 1 + nx + \frac{n(n-1)}{2}x^2 + \frac{n(n-1)(n-2)}{6}x^3$
$+ \ldots + n^x$, then $f'(1)$ is equal to

A. $n(n-1)2^{n-2}$

B. $n(n-1)^{2n}$

C. $n(n-1)^{2n-1}$

D. $(n-1)^{2n-1}$

Answer: A

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485. If $y = 5\cos x - 3\sin x$, prove that $\frac{d^2y}{dx^2} + y = 0.$

A. $-y$

B. y

C. $5y$

D. $-3y$

Answer: A

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486. If $y = \sec x - \tan x, \textit{then} \frac{d^2y}{dx^2} =$

A. $\frac{1}{4}\sec^2\left(\frac{\pi}{4} - \frac{x}{2}\right)\tan\left(\frac{\pi}{4} - \frac{x}{2}\right)$

B. $\frac{-1}{4}\sec^2\left(\frac{\pi}{4} - \frac{x}{2}\right)\tan\left(\frac{\pi}{4} - \frac{x}{2}\right)$

C. $\frac{1}{2}\sec^2\left(\frac{\pi}{4} - \frac{x}{2}\right)\tan\left(\frac{\pi}{4} - \frac{x}{2}\right)$

D. $\frac{-1}{2}\sec^2\left(\frac{\pi}{4} - \frac{x}{2}\right)\tan\left(\frac{\pi}{4} - \frac{x}{2}\right)$

Answer: C

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487. If $y = \cos^2\left(\frac{3x}{2}\right) - \sin^2\left(\frac{3x}{2}\right)$, *then* $\frac{d^2y}{dx^2}$ =

A. $-3\sqrt{1 - y^2}$

B. $3\sqrt{1 - y^2}$

C. $9y$

D. $-9y$

Answer: D

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488. If $y = \sin x\sqrt{\cos x}$, *then* $\frac{d^2y}{dx^2}$ =

A. $\frac{5}{2}\sin x\sqrt{\cos x} - \frac{\sin^3}{4\cos x\sqrt{\cos x}}$

B. $\frac{-5}{2}\sin x\sqrt{\cos x} - \frac{\sin^3}{4\cos x\sqrt{\cos x}}$

C. $\frac{-5}{2}\sin x\sqrt{\cos x} + \frac{\sin^3}{4\cos x\sqrt{\cos x}}$

D. $\frac{5}{2}\sin x\sqrt{\cos x} + \frac{\sin^3}{4\cos x\sqrt{\cos x}}$

Answer: B

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489. If $y = \cos(\log x), then \frac{d^2y}{dx^2} =$

A. $\frac{\cos(\log x) - \sin(\log x)}{x}$

B. $\frac{\sin(\log x) - \cos(\log x)}{x}$

C. $\frac{\cos(\log x) - \sin(\log x)}{x^2}$

D. $\frac{\sin(\log x) - \cos(\log x)}{x^2}$

Answer: D

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490. The number of values of b, for which in an acute triangle ABC, the coordinates of orthocentre H are $(4, b)$, that of centroid G are $(b, 2b - 8)$, and that of circumcenter S are $(-4, 8)$ is____

A. 1

B. 0

C. $m^2\left(ae^{mx}-be^{-mx}\right)$

D. $m\left(ae^{mx}-be^{-mx}\right)$

Answer: B

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491. If $y=a^x b^{2x-1}, then\dfrac{d^2y}{dx^2}=$

A. $y^2\log ab^2$

B. $y\left(\log\left(ab^2\right)\right)^2$

C. $y\log ab^2$

D. $y\left(\log\left(a^2b\right)\right)^2$

Answer: B

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492. If $y = \cos^{-1}x$, find $\frac{d^2y}{dx^2}$ in terms of y alone.

A. $-\cos ec y \cot y$

B. $\cos ec y \cot y$

C. $-\cos ec^2 y \cot y$

D. $\cos ec^2 y \cot y$

Answer: C

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493. if $y = \tan^{-1}x$,find $\frac{d^2y}{dx^2}$.

A. $\frac{-2x}{\left(1 + x^2\right)^2}$

B. $\frac{2x}{\left(1 + x^2\right)^2}$

C.

D. $\dfrac{x}{\left(1+x^2\right)^2}$

Answer: A

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494. If $y=\left(\tan^{-1}x\right)^2$, then $\left(x^2+1\right)^2\dfrac{d^2y}{dx^2}+2x\left(x^2+1\right)\dfrac{dy}{dx}=$

A. $\dfrac{2\left(1+2x\tan^{-1}x\right)}{\left(1+x^2\right)^2}$

B. $\dfrac{2\left(1-2x\tan^{-1}x\right)}{\left(1+x^2\right)^2}$

C. $\dfrac{2\left(1+x\tan^{-1}x\right)}{\left(1+x^2\right)^2}$

D. $\dfrac{2\left(1-x\tan^{-1}x\right)}{\left(1+x^2\right)^2}$

Answer: B

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495. If $y = \log\left(\frac{x^2}{e^x}\right)$, $then \frac{d^2y}{dx^2}$ =

A. $\frac{x}{2}$

B. $\frac{1}{2}$

C. $\frac{2}{2x}$

D. $\frac{-2}{x^2}$

Answer: D

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496. If $y = \log(\sin x)$, find $\frac{d^2y}{dx^2}$

A. $-\operatorname{cosec}x\cot x$

B. $\sec x\tan x$

C. $-\operatorname{cosec}^2 x$

D. $\sec^2 x$

Answer: C

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497. If $y = \sin x + e^x$, then $\dfrac{d^2x}{dy^2} =$

A. $\dfrac{1}{-\sin x + e^x}$

B. $\dfrac{\sin x - e^x}{\left(\cos x + e^x\right)^3}$

C. $\dfrac{\sin x - e^x}{\left(\cos x + e^x\right)^2}$

D. $\dfrac{\sin x + e^x}{\left(\cos x + e^x\right)^3}$

Answer: B

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498. If $x^2 + y^2 = 1, then \frac{d^2y}{dx^2}$ =

A. $\frac{-1}{y^3}$

B. $\frac{1}{3}$

C. $\frac{-y}{x^2}$

D. $\frac{y}{x^2}$

Answer: A

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499. If $\sin(x + y) + \cos(x + y) = \log(x + y), then \frac{d^2y}{dx^2} =$

A. $\frac{-y}{x}$

B. -1

C. 0

D. 1

Answer: C

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500. If $\sec\left(\frac{x+y}{x-y}\right)=a^2$, then $\frac{d^2y}{dx^2}=......$

A. y

B. x

C. $\frac{y}{x}$

D. 0

Answer: D

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501. If $e^{y} + xy = e$, the ordered pair $\left(\frac{dy}{dx}, \frac{d^2y}{dx^2}\right)$ at x = 0 is equal to

A. e^2

B. e

C. $\frac{1}{e^2}$

D. $\frac{1}{e}$

Answer: C

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502. If $y = x^x$, find $\frac{d^2y}{dx^2}$.

A. $x^x\left((1 + \log x)^2 + \frac{1}{x}\right)$

B. $x^x\left((1 + \log x)^2 - \frac{1}{x}\right)$

C. $x^x\left(1 + \log x + \frac{1}{2}\right)$

D. $x^x\left(1 + \log x - \frac{1}{x}\right)$

Answer: A

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503. If $y = x^2(\sin x + \cos x)$, $then \frac{d^2y}{dx^2} =$

A. $\left(2 - x^2\right)(\sin x + \cos x) + 4x(\cos x - \sin x)$

B. $\left(2 - x^2\right)(\sin x + \cos x) - 4x(\cos x - \sin x)$

C. $\left(x^2 - 2\right)(\sin x + \cos x) + 4x(\cos x - \sin x)$

D. $\left(x^2 - 2\right)(\sin x + \cos x) - 4x(\cos x - \sin x)$

Answer: A

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504. If $y = x\log x$, $then \frac{d^2y}{dx^2} =$

A. $\frac{1}{x}$

B. $\frac{-1}{x^2}$

C. 1

D. -1

Answer: A

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505. If $y = e^x \sin 3x$, $then \frac{d^2y}{dx^2} =$

A. $e^x(8\sin 3x - 6\cos 3x)$

B. $e^x(6\cos 3x - 8\sin 3x)$

C. `e^(x) (3sin 3x - 4cos 3x)

D. $e^x(3\cos 3x - 4\sin 3x)$

Answer: B

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506. If $y = e^{4x}\cos 5x$, *then* $\dfrac{d^2y}{dx^2} =$

A. $-e^{4x}(9\cos 5x + 20\sin 5x)$

B. $e^{4x}(9\cos 5x + 20\sin 5x)$

C. $-e^{4x}(9\cos 5x + 40\sin 5x)$

D. $e^{4x}(9\cos 5x + 40\sin 5x)$

Answer: C

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507. If $y = e^{2x}\tan x$, *then* $\dfrac{d^2y}{dx^2} =$

A. $e^{2x}(1 + \tan x)\left(2 + \tan x + \tan^2 x\right)$

B. $2e^{2x}(1 + \tan x)\left(2 + \tan x + \tan^2 x\right)$

C. $e^{2x}(1 + \tan x)\left(1 + \tan x + \tan^2 x\right)$

D. $2e^{2x}(1 + \tan x)\left(1 + \tan x + \tan^2 x\right)$

Answer: B

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508. If $y = x^3 \log x, \ then \dfrac{d^2y}{dx^2} =$

A. $5x + 6x\log x$

B. $6x + 5\log x$

C. $5x + 3x\log x$

D.

Answer: A

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509. If $y = x^n \log nx., \ then \dfrac{d^2y}{dx^2} =$

A. $x^{n-2}(n-1-n(n-1)\log nx)$

B. $x^{n-2}(n-1+n(n-1)\log nx)$

C. $x^{n-2}(2n-1-n(n-1)\log nx)$

D. $x^{n-2}(2n-1+n(n-1)\log nx)$

Answer: D

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510. If $y = x^3\log(\log(1+x)), then y''(0) =$

A. 6

B. 6log2

C. -1

D. 0

Answer: D

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511. If $y = \left\{\log\left(x + \sqrt{x^2 + 1}\right)\right\}^2$, s h o wt h a t $\left(1 + x^2\right)\frac{d^2y}{dx^2} + x\frac{dy}{dx} = 2.$

A. 0

B. 1

C. 2

D. -2

Answer: C

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512. If $y = \left(x + \sqrt{1 + x^2}\right)^n$ then $\left(1 + x^2\right)\frac{d^2y}{dx^2} + x\frac{dy}{dx}$

A. $-m^2y$

B. m^2y

C. $-my$

D. my

Answer: B

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513. If $y = \left(x + \sqrt{1 + x^2}\right)^n$ then $\left(1 + x^2\right)\frac{d^2y}{dx^2} + x\frac{dy}{dx}$

A. $-n^2y$

B. n^2y

C. $-y$

D. $2x^2y$

Answer: B

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514. (i) If $y^{1/m} + y^{-1/m} = 2x$ then prove that $\left(x^2 - 1\right)\frac{d^2y}{dx^2} + x\frac{dy}{dx} - m^2y = 0$

(ii) If y = ln $\left(x + \sqrt{1 + x^2}\right.$, then prove that $\left(1 + x^2\right)\frac{d^2y}{dx^2} + x\frac{dy}{dx} = 0$

A. $-m^2y^2$

B. m^2y^2

C. $-m^2y$

D. m^2y

Answer: D

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515. If $y = \sin(\sin x)$, p r o v et h a t $\frac{d^2y}{dx^2} + \tan x\frac{dy}{dx}\cos^2 x = 0.$

A. $\sin(\cos x)\cos^2 x$

B. $-\sin(\cos x)\cos^2 x$

C. $\sin(\cos x)\sin^2 x$

D. $\cos(\sin x)\sin^2 x$

Answer: B

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516. If $y = 3\cos(\log x) + 4\sin(\log x)$, then show that $x^2 \frac{d^2 y}{dx^2} + \frac{dy}{dx} + y = 0$

A. $-y$

B. y

C. $-12y$

D. $12y$

Answer: A

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517. If $y = \operatorname{cosec} x - \cot x$, $then \sin x \frac{d^2y}{dx^2} =$

A. $-(1+\cos x)\dfrac{dy}{dx}$

B. $(1+\cos x)\dfrac{dy}{dx}$

C. $-(1-\cos x)\dfrac{dy}{dx}$

D. $(1-\cos x)\dfrac{dy}{dx}$

Answer: D

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518. If $y=\sin\left(\log_e x\right)$, then $x^2\dfrac{d^2y}{dx^2}+x\dfrac{dy}{dx}$ is equal to

A. $\sin(\log x)$

B. $\cos(\log x)$

C. $-y$

D. y^2

Answer: C

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519. If $y = \cos(\log x)$, *then* $x^2\dfrac{d^2y}{dx^2} + x\dfrac{dy}{dx} =$

A. 0

B. 1

C. y

D. $-y$

Answer: D

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520. If $y = \sin\left(m\sin^{-1}x\right)$, *then* $\left(1 - x^2\right)\dfrac{d^2y}{dx^2} - x\dfrac{dy}{dx} =$

A. $-2m^2y$

B. $2m^2y$

C. $-m^2y$

D. m^2y

Answer: C

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521. If $y = \sin\left(m\cos^{-1}x\right)$, show that $\left(1 - x^2\right)\frac{d^2y}{dx^2} - x\frac{dy}{dx} + m^2y = 0$

A. m^2y

B. $-m^2y$

C. my

D. $-my$

Answer: B

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522. If $y = \cos\left(m\cos^{-1}x\right), then\left(1 - x^2\right)\frac{d^2y}{dx^2} - x\frac{dy}{dx} =$

A. my

B. $-my$

C. m^2y

D. $-m^2y$

Answer: D

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523. If $y = \sin\left(m\log\left(x + \sqrt{1 + x^2}\right)\right)$, $then\left(1 + x^2\right)\dfrac{d^2y}{dx^2} + x\dfrac{dy}{dx} =$

A. $-m^2y$

B. m^2y

C. $-my$

D. my

Answer: A

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524. If $y = a\cos(\log x) + b\sin(\log x) where a, b are$ parameters ,then $x^2y'' + xy' =$

A. $-2y$

B. $2y$

C. $-y$

D. y

Answer: C

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525. If $y = 3e^{2x} + 2e^{3x}, then \frac{d^2y}{dx^2} - 5\frac{dy}{dx} =$

A. 6y

B. $-6y$

C. $3y$

D. $-3y$

Answer: B

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526. If $u = Ae^{mx} + Be^{nx}, theny_2 - (m+n)y_1 + mny =$

A. m

B. n

C. 1

D. 0

Answer: D

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527. If $y = e^{m\cos^{-1}x}$, then $\left(1 - x^2\right)\frac{d^2y}{dx^2} - x\frac{dy}{dx} =$

A. $-m^2y$

B. m^2y

C. $-2m^2y$

D. $2m^2y$

Answer: B

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528. If $y = x^2e^x$, then $\frac{d^2y}{dx^2} - \frac{dy}{dx} =$

A. $(x + 1)e^x$

B. $-(x + 1)e^x$

C. $2(x + 1)e^x$

D. $-2(x + 1)e^x$

Answer: C

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529. If $e^y(x+1)=1, then y_2=$

A. y_1^2

B. $-y_1^2$

C. $2y_1$

D. $-2y_1$

Answer: A

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530. $(a+bx)e^{\frac{y}{x}}=x$, Prove that $x^3\frac{d^2y}{dx^2}=\left(x\frac{dy}{dx}-y\right)^2$

A. $x\frac{dy}{dx}-y$

B. $x\frac{dy}{dx}+y$

C. $\left(x\frac{dy}{dx}-y\right)^2$

D. $\left(x\frac{dy}{dx}+y\right)^2$

Answer: C

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531. If $y = x\log\left(\frac{x}{a+bx}\right)$, then $x^3\frac{d^2y}{dx^2} =$

A. $x\frac{dy}{dx}-y$

B. $y\frac{dy}{dx}-x$

C. $\left(y\frac{dy}{dx}-x\right)^2$

D. $\left(x\frac{dy}{dx}-y\right)^2$

Answer: D

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532. If $y = \log(\log 2x), then x\frac{d^2y}{dx^2} + \frac{dy}{dx} =$

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533. If $y = \sin^{-1}x$, then show that $\left(1 - x^2\right)\frac{d^2y}{dx^2} - x\frac{dy}{dx} = 0$.

A. 2

B. -2

C. 1

D. 0

Answer: D

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534. If $y = \left(\tan^{-1}x\right)^2$, then prove that $\left(1 + x^2\right)^2 y_2 + 2x\left(1 + x^2\right)y_1 = 2$.

A. -2

B. 2

C. $-2x$

D. 2x

Answer: B

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535. If $y = x^x, then xy\frac{d^2y}{dx^2} - x\left(\frac{dy}{dx}\right)^2 =$

A. $-y^2$

B. y^2

C. $-xy^2$

D. xy^2

Answer: B

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536. If $x = at^2, y = 2at$ then $\frac{d^2y}{dx^2}$ is equal to

A. $\frac{1}{2at^3}$

B. $\frac{-1}{2at^3}$

C. $\frac{2a}{t^3}$

D. $\frac{-2a}{t^3}$

Answer: B

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537. If $x = 2at^2, y = 4at, then \frac{d^2y}{dx^2} =$

A. $\frac{-1}{2at^3}$

B. $\frac{1}{2at^3}$

C. $\frac{-1}{4at^3}$

D. $\frac{1}{4at^3}$

Answer: C

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538. let $y = t^{10} + 1$, and $x = t^8 + 1$, then $\frac{d^2y}{dx^2}$ is

A. $\frac{5t}{2}$

B. $\frac{5}{(16t)^6}$

C. $20t^8$

D. $8t^7$

Answer: B

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539. If $x = a\sec\theta, y = a\tan\theta, then$ at $\theta = \frac{\pi}{4}, \frac{d^2y}{dx^2} =$

A. $\frac{-1}{a}$

B. $\frac{1}{a}$

C. $-a$

D. a

Answer: A

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540. If $x = \sin\theta, y = \sin^3\theta$ then $\frac{d^2y}{dx^2}$ at $\theta = \frac{\pi}{2}$ is ....

A. 6

B. -6

C. 3

D. -3

Answer: A

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541. If $x = \cos\theta, y\sin^3\theta$, p r o v et h a t $y\dfrac{d^2y}{dx^2} + \left(\dfrac{dy}{dx}\right)^2 = 3\sin^2\theta\left(5\cos^2\theta - 1\right)$.

A. $3\sin^2\theta\left(1 - 2\cos^2\theta\right)$

B. $3\sin^2\theta\left(2\cos^2\theta - 1\right)$

C. $3\sin^2\theta\left(1 - 5\cos^2\theta\right)$

D. $3\sin^2\theta\left(5\cos^2\theta - 1\right)$

Answer: D

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542. If $x = a\cos^3\theta$ and $y = a\sin^3\theta$, then find the value of $\dfrac{d^2y}{dx^2}$ at $\theta = \dfrac{\pi}{6}$.

A. $\dfrac{\sec^2\theta}{3a\sin\theta}$

B. $\dfrac{-\sec^2\theta}{3a\sin\theta}$

C. $\dfrac{\sec^4\theta}{3a\sin\theta}$

D. $\dfrac{-\sec^4\theta}{3a\sin\theta}$

Answer: C

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543. If $x = a\sin\theta, y = b\cos\theta, then \dfrac{d^2y}{dx^2} =$

A. $\dfrac{-b}{a^2}\sec^2\theta$

B. $\dfrac{-b}{a}\sec^2\theta$

C. $\dfrac{a}{b}\sec^2\theta$

D. $\dfrac{-b^2}{a^2}\sec^3\theta$

Answer: A

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544. If $x = 2\cos t - \cos 2t, y = 2\sin t - \sin 2t$, then the value of

$$\left|\frac{d^2y}{dx^2}\right|_{t=\pi/2}$$ is

A. $\frac{3}{2\sqrt{2}}$

B. $\frac{-3}{2\sqrt{2}}$

C. $\frac{3}{2}$

D. $\frac{-3}{2}$

Answer: D

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545. If $x = a\sin t - b\cos t, y = a\cos t + b\sin t, then y^3\frac{d^2y}{dx^2} =$

A. $-\left(a^2 + b^2\right)$

B. $a^2 + b^2$

C. $x^2 + y^2$

D. $-\left(x^2+y^2\right)$

Answer: D

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546. If $x=\theta-\sin\theta, y=1-\cos\theta, then\dfrac{d^2y}{dx^2}=$

A. $\dfrac{-1}{4\sin^4\left(\frac{\theta}{2}\right)}$

B. $\dfrac{1}{4\sin^4\left(\frac{\theta}{2}\right)}$

C. $\dfrac{-1}{2\sin^4\left(\frac{\theta}{2}\right)}$

D. $\dfrac{1}{2\sin^2\left(\frac{\theta}{2}\right)}$

Answer: A

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547. if $x = a(\cos\theta + \theta\sin\theta), y = a(\sin\theta - \theta\cos\theta)$ then $\frac{d^2y}{dx^2}$

A. $\frac{\sqrt{2}}{a\pi}$

B. $\frac{2\sqrt{2}}{a\pi}$

C. $\frac{4\sqrt{2}}{a\pi}$

D. $\frac{8\sqrt{2}}{a\pi}$

Answer: D

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548. If $x = \sin\sqrt{t}, y = e^{\sqrt{t}}, then \frac{d^2y}{dx^2} =$

A. $\frac{e^{\sqrt{t}}\left(\cos\sqrt{t} - \sin\sqrt{t}\right)}{\cos^2\sqrt{t}}$

B. $\frac{e^{\sqrt{t}}\left(\cos\sqrt{t} + \sin\sqrt{t}\right)}{\cos^2\sqrt{t}}$

C. $\dfrac{e^{\sqrt{t}}\left(\cos\sqrt{t} - \sin\sqrt{t}\right)}{\cos^3\sqrt{t}}$

D. $\dfrac{e^{\sqrt{t}}\left(\cos\sqrt{t} + \sin\sqrt{t}\right)}{\cos^3\sqrt{t}}$

Answer: D

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549. If $x = \sqrt{a^{\sin} \wedge ((-1)t)}, y = \sqrt{a^{\cos} \wedge ((-1)t)}$, show that $\dfrac{dy}{dx} = -\dfrac{y}{x}$

A. $\dfrac{-2y}{x^2}$

B. $\dfrac{2y}{x^2}$

C. $\dfrac{-y}{x^2}$

D. $\dfrac{y}{x^2}$

Answer: B

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550. The second order derivative of $a\sin^3 t$ w.r.t, $a\cos^3 t$ at $t = \frac{\pi}{4}$ is

A. $\frac{4\sqrt{2}}{3a}$

B. $\frac{2\sqrt{2}}{3a}$

C. $\frac{1}{12a}$

D. 2

Answer: A

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551. If $x = \log\theta, \theta > 0$ and $y = \frac{1}{\theta}, then \frac{d^2y}{dx^2} =$

A. 0

B. 1

C. $\frac{dy}{dx}$

D. $-\left(\frac{dy}{dx}\right)$

Answer: D

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552. Let $f(x)$ be a polynomial.Then, the second order derivative of $f\left(e^x\right)$ is

$f^{e^x}e^{2x} + f'\left(e^x\right)e^x \; f^{e^x}e^x + f'\left(e^x\right) \; f^{e^x}e^{2x} + f^{e^x}e^x$ (d) f^{e^x}

A. $f''\left(e^x\right)e^{2x} + f'\left(e^x\right)e^x$

B. $f''\left(e^x\right)e^{2x} + f'\left(e^x\right)$

C. $f'\left(e^x\right)$

D. $f''\left(e^x\right)e^x + f'\left(e^x\right)$

Answer: A

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553. If $x = f(t)$ and yy=g(t) are differentiable functions of t then $\frac{d^2y}{dx^2}$ is

A. $\frac{f'(t)g''(t) - g'(t)f''(t)}{(f'(t))^3}$

B. $\frac{f'(t)g''(t) - g'(t)f''(t)}{(f'(t))^2}$

C. $\frac{g'(t)f''(t) - f'(t)g''(t)}{(f'(t))^3}$

D. $\frac{g'(t)f''(t) + f'(t)g''(t)}{(f'(t))^3}$

Answer: A

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554. $\frac{d^2x}{dy^2}$ equals

A. $-\left(\frac{dy}{dx}\right)^3\frac{d^2y}{dx^2}$

B. $\left(\frac{dy}{dx}\right)^3\frac{d^2y}{dx^2}$

C. $-\left(\frac{dy}{dx}\right)^{-3}\frac{d^2y}{dx^2}$

D. $\left(\frac{dy}{dx}\right)^{-3}\frac{d^2y}{dx^2}$

Answer: C

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555. $\frac{d^2x}{dy^2}$ equals

A. $\frac{d^2y}{dx^2}$

B. $\frac{1}{\left(\frac{dy}{dx}\right)^2}$

C. $\frac{1}{\left(\frac{dy}{dx}\right)^2}\frac{d^2y}{dx^2}$

D. $\frac{-1}{\left(\frac{dy}{dx}\right)^2}\frac{d^2y}{dx^2}$

Answer: D

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556. Given $f(x) = 2x, x < 0 = 0, x \geq 0$, then $f(x)$ is

A. discontinuous and not differentiable at x =0

B. continuous and differentiable at x =0

C. discontinuous and differentiable at x=0

D. continuous and not differentiable at x =0

Answer: D

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557. If g(x) is the inverse function of f(x) and $f'(x) = \frac{1}{1 + x^4}$, then $g'(x)$ is

A. $(1 + g(x))^4$

B. $(1 - g(x))^4$

C. $1 + (f(x))^4$

D. $\frac{1}{1 + (g(x))^4}$

Answer: A

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558. If for $x\left(0, \frac{1}{4}\right)$, the derivative of $\tan^{-1}\left(\frac{6x\sqrt{x}}{1-9x^3}\right)$ is $\sqrt{x}g(x)$, then $g(x)$ equals: $\frac{3x}{1-9x^3}$ (2) $\frac{3}{1+9x^3}$ (3) $\frac{9}{1+9x^3}$ (4) $\frac{3x\sqrt{x}}{1-9x^3}$

A. $\frac{3}{1+9x^3}$

B. $\frac{9}{1+9x^3}$

C. $\frac{3x\sqrt{x}}{1-9x^3}$

D. $\frac{3x}{1-9x^3}$

Answer: B

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559. Derivative of $\tan^3\theta$ with respect to $\sec^3\theta$ at $\theta = \frac{\pi}{3}$ is

A. $\frac{3}{2}$

B. $\frac{\sqrt{3}}{2}$

C. $\frac{1}{2}$

D. $\frac{-\sqrt{3}}{2}$

Answer: B

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