



MATHS

BOOKS - NIKITA MATHS (HINGLISH)

CONTINUITY

MULTIPLE CHOICE QUESTIONS

1. The function $f(x) = \frac{2x^2 + 7}{x^3 + 3x^2 - x - 3}$ is discontinuous for

A. $x = 1$ only

B. $x = 1, -1$ only

C. $x = 1, -1, -3$ and other values of x

D. $x = 1, -1, -3$ only

Answer: D



2. Find the points of discontinuity of $y = \frac{1}{u^2 + u - 2}$, where $u = \frac{1}{x - 1}$

A. $x = 2, \frac{1}{2}$

B. $x = 1, 2, \frac{1}{2}$

C. $x = 2, \frac{-1}{2}$

D. $z = 1, 2, \frac{-1}{2}$

Answer: B



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3. If $f(x)$ is continuous at $x = 3$, where $f(x) = \frac{x^2 - 7x + 12}{x^2 - 5x + 6}$, for $x \neq 3$,

then $f(3) =$

A. -1

B. 1

C. $\frac{1}{5}$

D. $\frac{7}{5}$

Answer: A



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4. If $f(x)$ is continuous for all x , where $f(x) = \begin{cases} \frac{x^2 - 7x + 12}{(x-2)^2}, & \text{for } x \neq 2 \\ k, & \text{for } x = 2 \end{cases}$,

then $k =$

A. 7

B. -7

C. ± 7

D. None of these

Answer: A



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5. if the function $f(x) = \frac{x^2 - (a + 2)x + a}{x - 2}$ for $x \neq 2$ and $f(x) = 2$ for $x = 2$ is continuous function at $x = 2$ then value of a is:

A. 2

B. -1

C. 1

D. 0

Answer: D



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6. If $f(x)$ is continuous at $x = 2$, where $f(x) = \frac{(x^2 - x - 2)^{20}}{(x^3 - 12x + 16)^{10}}$, for $x \neq 2$, then $f(2) =$

A. $\frac{3^{20}}{2^{10}}$

B. $\frac{3^{10}}{2^{20}}$

C. $\left(\frac{3}{2}\right)^{10}$

D. $\left(\frac{3}{2}\right)^{20}$

Answer: C



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7. If $f(x)$ is continuous at $x = -2$, where

$$f(x) = \frac{2}{x+2} + \frac{1}{x^2 - 2x + 4} - \frac{24}{x^3 + 8}, \quad \text{for } x \neq -2, \quad \text{then}$$

$$f(-2) =$$

A. $\frac{-1}{4}$

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

C. $\frac{11}{12}$

D. $\frac{-11}{12}$

Answer: D



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8. If $f(x)$ is continuous at $x = 1$, where $f(x) = \frac{x^n - 1}{x - 1}$, for $x \neq 1$, then

$$f(1) =$$

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

B. $\frac{1}{n(n-1)}$

C. n

D. $n(n-1)$

Answer: C



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9. Examine the continuity of the given function at given points

$$f(x) = \frac{x + 3x^2 + 5x^3 + \dots + (2n-1)x^n - n^2}{x-1}, \quad \text{for } x \neq 1 \quad \text{at}$$

$$x = 1 \quad \text{and} \quad = \frac{n(n^2-1)}{3}, \text{ for } x = 1$$

A. $\frac{n(n+1)(2n-1)}{6}$

B. $\frac{n(n+1)(2n-1)}{3}$

C. $\frac{n(n+1)(4n-1)}{6}$

D. $\frac{n(n+1)(4n-1)}{3}$

Answer: C



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10. If $f(x)$ is continuous at $x = 3$, where $f(x) = \begin{cases} \frac{x^2-9}{x-3} & , \text{ for } x \neq 3 \\ 2x + k & , \text{ otherwise} \end{cases}$,

then $k =$

A. 0

B. 3

C. -6

D. $\frac{1}{6}$

Answer: A



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11. If $f(x)$ is continuous at $x = 16$, where

$$f(x) = \begin{cases} \frac{x^8 - (256)^4}{x^4 - (16)^4}, & \text{for } x \neq 16 \\ k, & \text{for } x = 16 \end{cases}, \text{ then } k =$$

A. $(16)^4$

B. $2(16)^4$

C. $4(16)^4$

D. $3(16)^4$

Answer: B



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12. The value of $f(0)$, so that the function

$$f(x) = \frac{(27 - 2x)^2 - 3}{9 - 3(243 + 5x)^{1/5} - 2} (x \neq 0) \text{ is continuous, is given } \frac{2}{3} \text{ (b) } 6$$

(c) 2 (d) 4

A. -2

B. 2

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

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

Answer: B



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13. If $f(x) = (1 + x)^{5/x}$ is continuous at $x=0$, then what is the value of $f(0)$?

A. $\frac{1}{3}$

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

C. $\frac{5}{6}$

D. $\frac{1}{6}$

Answer: D

14. If the function $f(x)$ defined as : $f(x) = \frac{x^4 - 64x}{\sqrt{x^2 + 9} - 5}$, for $x \neq 4$ and $=3$, for $x = 4$ Show that $f(x)$ has a removable discontinuity at $x = 4$

A. 120

B. 240

C. 120

D. -240

Answer: B

15. The value of $f(0)$, so that the function

$f(x) = \frac{\sqrt{a^2 - ax + x^2} - \sqrt{a^2 + ax + x^2}}{\sqrt{a+x} - \sqrt{a-x}}$ becomes continuous for all x , given by $a^{\frac{3}{2}}$ (b) $a^{\frac{1}{2}}$ (c) $-a^{\frac{1}{2}}$ (d) $-a^{\frac{3}{2}}$

A. $-a\sqrt{a}$

B. $a\sqrt{a}$

C. $-\sqrt{a}$

D. \sqrt{a}

Answer: C



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16. Evaluate : $(\lim)_{x \rightarrow 2a^+} \frac{\sqrt{x-2a} + \sqrt{x} - \sqrt{2a}}{x^2 - 4a^2}$

A. $2\sqrt{a}$

B. $2a$

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

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

Answer: C



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17. If $f(x)$ is continuous at $x = \sqrt{2}$, where

$$f(x) = \frac{\sqrt{3+2x} - (\sqrt{2} + 1)}{x^2 - 2}, \text{ for } x \neq \sqrt{2}, \text{ then } f(\sqrt{2}) =$$

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

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

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

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

Answer: A



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18. If $f(x)$ is continuous at $x = 5$, where $f(x) = \frac{\sqrt{3 + \sqrt{4 + x}} - \sqrt{6}}{x - 5}$,

for $x \neq 5$, then $f(5) =$

A. $\frac{1}{2\sqrt{6}}$

B. $\frac{1}{3\sqrt{6}}$

C. $\frac{1}{12\sqrt{6}}$

D. None of these

Answer: C



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19. If $f(x)$ is continuous at $x = 0$, where $f(x) = \sin x - \cos x$, for $x \neq 0$, then $f(0) =$

A. 2

B. 0

C. -1

D. 1

Answer: C



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20. If $f(x)$ is continuous at $x = \frac{\pi}{2}$, where $f(x) = \frac{\sqrt{2} - \sqrt{1 + \sin x}}{\cos^2 x}$, for $x \neq \frac{\pi}{2}$, then $f\left(\frac{\pi}{2}\right) =$

A. $4\sqrt{2}$

B. $2\sqrt{2}$

C. $\frac{1}{4\sqrt{2}}$

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

Answer: C



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21. If $f(x)$ is continuous at $x = \frac{\pi}{4}$, where $f(x) = \frac{1 - \tan x}{1 - \sqrt{2} \sin x}$, for $x \neq \frac{\pi}{4}$, then $f\left(\frac{\pi}{4}\right) =$

A. 2

B. $\sqrt{2}$

C. $2\sqrt{2}$

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

Answer: A



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22. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{\sin(\pi \cos^2 x)}{x^2}$, for $x \neq 0$, then $f(0) =$

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

B. 1

C. $-\pi$

D. π

Answer: D



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23. If $f(x)$ is continuous at $x = \frac{\pi}{4}$ where

$$f(x) = \frac{2\sqrt{2} - (\cos x + \sin x)^3}{1 - \sin 2x}, \text{ for } x \neq \frac{\pi}{4} \text{ then } f\left(\frac{\pi}{4}\right) =$$

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

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

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

D. $3\sqrt{2}$

Answer: A



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24. If $f(x)$ is continuous at $\theta = \frac{\pi}{4}$, where

$$f(\theta) = \begin{cases} \frac{1 - \tan \theta}{1 - \sqrt{2} \sin \theta}, & \text{for } \theta \neq \frac{\pi}{4} \\ \frac{k}{2}, & \text{for } \theta = \frac{\pi}{4} \end{cases}, \text{ then } k =$$

A. $2\sqrt{2}$

B. $4\sqrt{2}$

C. 2

D. 4

Answer: D



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25. The function $f(x) = \frac{1 - \sin x + \cos x}{1 + \sin x + \cos x}$ is not defined at $x = \pi$. The value of $f(\pi)$, so that $f(x)$ is continuous at $x = \pi$, is

A. -1

B. 1

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

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

Answer: A



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26. If $f(x)$ is continuous at $x = \frac{\pi}{2}$, where $f(x) = \frac{\cos x}{\sqrt{1 - \sin x}}$, for $x \neq \frac{\pi}{2}$, then $f\left(\frac{\pi}{2}\right) =$

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

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

C. $2\sqrt{2}$

D. $\sqrt{2}$

Answer: D



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27. If $f(x)$ is continuous at $x = \frac{\pi}{4}$, where $f(x) = \frac{\cos x - \sin x}{\cos 2x}$, for $x \neq \frac{\pi}{4}$, then $f\left(\frac{\pi}{4}\right) =$

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

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

C. $\sqrt{2}$

D. $-\sqrt{2}$

Answer: A



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28. If $f(x)$ is continuous at $x = \frac{\pi}{4}$, where $f(x) = \frac{2 - \operatorname{cosec}^2 x}{\cot x - 1}$, for $x \neq \frac{\pi}{4}$, then $f\left(\frac{\pi}{4}\right) =$

A. 4

B. -4

C. -2

D. None of these

Answer: C



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29. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{\sin(x^2 - x)}{x}$, for $x \neq 0$, then $f(0) =$

A. -1

B. 1

C. 0

D. 2

Answer: A



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30. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} \frac{x \cos x + 3 \tan x}{x^2 + \sin x}, & \text{for } x \neq 0 \\ k^2, & \text{for } x = 0 \end{cases}, \text{ then } k =$$

A. 2

B. -2

C. ± 2

D. None of these

Answer: C



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31. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \frac{\sin(a+x) - \sin(a-x)}{\tan(a+x) - \tan(a-x)}, x \neq 0, \text{ then } f(0) =$$

A. $2 \sec^3 a$

B. $\sec^3 a$

C. $\cos^3 a$

D. None of these

Answer: A



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32. $f: \mathbb{R} \rightarrow \mathbb{R}$ is defined by $f(x) = \begin{cases} \frac{\cos 3x - \cos x}{x^2}, & x \neq 0 \\ \lambda, & x = 0 \end{cases}$

and f is continuous at $x = 0$; then $\lambda =$

A. -4

B. -2

C. -8

D. -6

Answer: A



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33. If $f(x)$ is continuous at $x = 0$, where $f(x) = \begin{cases} \frac{1 - \cos x}{x}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$,

then $k =$

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

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

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

D. 0

Answer: D



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34. If $f(x)$ is continuous at $x = 0$, where $f(x) = \begin{cases} \frac{1 - \cos kx}{x^2}, & \text{for } x \neq 0 \\ \frac{1}{2}, & \text{for } x = 0 \end{cases}$,
then $k =$

A. 1

B. -1

C. ± 1

D. None of these

Answer: D



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35. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{1 - \cos 3x}{x \tan x}$ for $x \neq 0$, then $f(0) =$

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

B. $\frac{9}{2}$

C. $\frac{3}{4}$

D. None of these

Answer: B



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36. If the function $f(x) \begin{cases} \frac{1 - \cos 4x}{8x^2}, & x \neq 0 \\ k, & x = 0 \end{cases}$ is continuous at $x = 0$ then $k =$?

A. 16

B. 2

C. -1

D. 1

Answer: D



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37. If $f(x) =$ is continuous at $x = 0$, where

$$f(x) = \frac{(1 - \cos 2x)(3 + \cos x)}{x \tan 4x}, \text{ for } x \neq 0, \text{ then } f(0) =$$

A. 2

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

C. 4

D. None of these

Answer: D



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38. If α, β are the roots of $ax^2 + bx + c = 0$ and $f(x)$ is continuous at

$$x = \alpha, \text{ where } f(x) = \frac{1 - \cos(ax^2 + bx + c)}{(x - \alpha)^2}, \text{ for } x \neq \alpha, \text{ then } f(\alpha) =$$

A. 0

B. $\frac{4ac - b^2}{2}$

C. $\frac{b^2 - 4ac}{2}$

D. None of these

Answer: C



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39. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} \frac{\cos^2 x - \sin^2 x - 1}{\sqrt{x^2 + 1} - 1}, & \text{for } x \neq 0 \\ 2k, & \text{for } x = 0 \end{cases}, \text{ then } k =$$

A. -2

B. -4

C. 2

D. None of these

Answer: A



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40. If $f(x)$ is continuous at $x = a$, where

$$f(x) = \frac{\sin(a+x) + \sin(a-x) - 2\sin a}{x \sin x}, \text{ for } x \neq a, \text{ then } f(a) =$$

A. $\frac{2}{a}(\cos a - 1)$

B. $\frac{1}{a}(\cos a - 1)$

C. $\frac{1}{a}(1 - \cos a)$

D. None of these

Answer: A



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41. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{3 - 4 \cos x + \cos 2x}{x^2}$,
for $x \neq 0$, then $f(0) =$

A. 0

B. 2

C. -2

D. 4

Answer: A



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42. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{3 - 4 \cos x + \cos 2x}{x^4}$,
for $x \neq 0$, then $f(0) =$

A. $\frac{1}{4}$

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

C. 8

D. 4

Answer: B



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43. The value of k which makes $f(x) = \begin{cases} \sin\left(\frac{1}{x}\right), & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$ continuous at $x = 0$ is

A. 0

B. 1

C. -1

D. no value of k

Answer: D



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44. If the function $f(x)$ defined by

$$f(x) = \begin{cases} x \sin \frac{1}{x}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$$

is continuous at $x = 0$, then k is equal to

A. 0

B. 1

C. -1

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

Answer: A



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45. If $f(x)$ is continuous at $x = a$, where $f(x) = (x - a) \sin\left(\frac{1}{x - a}\right)$,
for $x \neq a$, then $f(a) =$

A. 1

B. -1

C. 0

D. ∞

Answer: C



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46. If $f(x) = \frac{1 - \sqrt{3}\tan x}{\pi - 6x}$, for $x \neq \frac{\pi}{6}$ is continuous at $x = \frac{\pi}{6}$, find $f\left(\frac{\pi}{6}\right)$.

A. $\frac{1}{3\sqrt{3}}$

B. $\frac{1}{2\sqrt{3}}$

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

D. $\frac{4}{3\sqrt{3}}$

Answer: C



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47. If $f(x)$ is continuous at $x = \frac{\pi}{4}$, where $f(x) = \frac{\tan\left(\frac{\pi}{4} - x\right)}{\cot 2x}$, for $x \neq \frac{\pi}{4}$, then $f\left(\frac{\pi}{4}\right) =$

A. 2

B. 1

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

D. $\frac{1}{4}$

Answer: C



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48. Find the value of k, if the functions are continuous at the points given against them :

$$\left. \begin{aligned} f(x) &= \frac{\sqrt{3} - \tan x}{\pi - 3x}, & \text{for } x &\neq \frac{\pi}{3} \\ &= k, & \text{for } x &= \frac{\pi}{3} \end{aligned} \right\} \text{ at } x = \frac{\pi}{3}.$$

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

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

C. $\frac{-4}{3}$

D. $\frac{4}{3}$

Answer: D



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49. If $f(x)$ is continuous at $x = \frac{\pi}{2}$, where $f(x) = \frac{1 - \sin x}{\left(\frac{\pi}{2} - x\right)^2}$, for $x \neq \frac{\pi}{2}$, then $f\left(\frac{\pi}{2}\right) =$

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

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

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

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

Answer: A



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50. If $f(x)$ is continuous at $x = \frac{\pi}{2}$, where $f(x) = \frac{1 - \sin x}{(\pi - 2x)^2}$, for $x \neq \frac{\pi}{2}$, then $f\left(\frac{\pi}{2}\right) =$

A. $\frac{-1}{4}$

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

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

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

Answer: D



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51. If $f(x) = \begin{cases} \frac{1 - \sin x}{\pi - 2x} & , x \neq \frac{\pi}{2} \\ \lambda & , x = \frac{\pi}{2} \end{cases}$, be continuous at $x = \frac{\pi}{2}$, then

value of λ is

A. -1

B. 1

C. 0

D. 2

Answer: C



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52. For what value of k , function $f(x) = \begin{cases} \frac{k \cos x}{\pi - 2x}, & \text{if } x \neq \frac{\pi}{2} \\ 3, & \text{if } x = \frac{\pi}{2} \end{cases}$ is continuous at $x = \frac{\pi}{2}$?

A. 3

B. -3

C. 6

D. -6

Answer: C



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53. If $f(x)$ is continuous at $x = \frac{\pi}{2}$, where

$$f(x) = \frac{\cos ex - \sin x}{\frac{\pi}{2} - x}, \text{ for } x \neq \frac{\pi}{2}, \text{ then } f\left(\frac{\pi}{2}\right) =$$

A. $\frac{1}{4}$

B. 0

C. $\frac{1}{6}$

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

Answer: B



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54. If $f(x)$ is continuous at $x = \pi$, where

$$f(x) = \frac{\sqrt{2 + \cos x} - 1}{(\pi - x)^2}, \text{ for } x \neq \pi, \text{ then } f(\pi) =$$

A. $\frac{1}{4}$

B. $\frac{-1}{4}$

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

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

Answer: A



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55. If $f(x)$ is continuous at $x = \pi$, where $f(x) = \frac{1 - \cos(7(x - \pi))}{5(x - \pi)^2}$, for $x \neq \pi$, then $f(\pi) =$

A. $\frac{49}{5}$

B. $\frac{49}{10}$

C. $\frac{7}{2}$

D. None of these

Answer: B



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56. If $f(x)$ is continuous at $x = 0$, where $f(x) = (1 + 2x)^{\frac{1}{x}}$, for $x \neq 0$, then $f(0) =$

A. e^2

B. e^{-2}

C. $2e$

D. None of these

Answer: A



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57. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} (1 + 3x)^{\frac{1}{x}}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}, \text{ then } k =$$

A. e^{-3}

B. e^3

C. $3e$

D. None of these

Answer: B



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58. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \left(\frac{4 - 3x}{4} \right)^{\frac{8}{x}}, \text{ for } x \neq 0, \text{ then } f(0) =$$

A. e^{-3}

B. e^{-4}

C. e^{-6}

D. e^{-12}

Answer: C



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59. If $f(x) = \begin{cases} \frac{x^2-4}{x-2}, & \text{for } x \neq 2 \\ 5, & \text{for } x = 2 \end{cases}$, then at $x = 2$

- A. f is continuous if $f(0) = -2$
- B. f is continuous
- C. f has removable discontinuity
- D. f has irremovable discontinuity

Answer: C



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60. If $f(x) = \begin{cases} \sqrt[3]{\frac{4x+1}{1-4x}}, & \text{for } x \neq 0 \\ e^6, & \text{for } x = 0 \end{cases}$, then at $x = 0$

- A. f is continuous if $f(0) = e^{-8}$
- B. f is continuous
- C. f has irremovable discontinuity
- D. f has removable discontinuity

Answer: D



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61. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \left(\frac{4 - 3x}{4 + 5x} \right)^{\frac{1}{x}}, \text{ for } x \neq 0, \text{ then } f(0) =$$

A. e^2

B. e^{-2}

C. e^{-3}

D. e^5

Answer: B



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62. If $f(x)$ is continuous at $x = 2$, where $f(x) = (x - 1)^{\frac{1}{2-x}}$, for $x \neq 2$, then $f(2) =$

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

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

C. $-e$

D. None of these

Answer: B



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63. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} (\sec^2 x)^{\cot^2 x}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}, \text{ then } k =$$

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

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

C. e

D. None of these

Answer: C

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64. If $f(x)$ is continuous at $x = \frac{\pi}{4}$, where $f(x) = (1 + \cos 2x)^{4 \sec 2x}$, for $x \neq \frac{\pi}{4}$, then $f\left(\frac{\pi}{4}\right) =$

A. e^{-4}

B. e^4

C. $4e$

D. e

Answer: B

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65. In order that the function $f(x) = (x + 1)^{\cot x}$ is continuous at $x = 0$, $f(0)$ must be defined as

A. $f(0) = 0$

B. $f(0) = e$

C. $f(0) = \frac{1}{e}$

D. $f(0) = \frac{2}{e}$

Answer: B



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66. $f(x) = \begin{cases} \left(\tan\frac{\pi}{4} + x\right)^{1/x}, & x \neq 0 \\ k, & x = 0 \end{cases}$ for what value of k , $f(x)$ is

continuous at $x = 0$?

A. e

B. e^{-1}

C. e^2

D. e^{-2}

Answer: C



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67. The function $f(x) = (\sin 2x)^{\tan^2 2x}$ is not defined at $x = \frac{\pi}{4}$. The value

of $f(\pi/4)$, so that f is continuous at $x = \pi/4$, is

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

B. $\frac{-1}{\sqrt{e}}$

C. \sqrt{e}

D. e^{-2}

Answer: A



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68. If $f(x)$ is continuous at $x = 1$, where $f(x) = (\log_2 2x)^{\frac{1}{\log_2 x}}$, for $x \neq 1$,

then $f(1) =$

A. 0

B. 1

C. e

D. None of these

Answer: C



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69. If $f(x)$ is continuous at $x = 0$, where $f(x) = \begin{cases} \frac{8^x - 2^x}{k^x - 1}, & \text{for } x \neq 0 \\ 2, & \text{for } x = 0 \end{cases}$,

then $k =$

A. 4

B. -2

C. 2

D. None of these

Answer: C



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70. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{4^x - e^x}{6^x - 1}$, for $x \neq 0$, then $f(0) =$

A. $\frac{\log 4 - 1}{\log 6}$

B. $\frac{1 - \log 4}{\log 6}$

C. $\frac{\log 2 - 2}{\log 6}$

D. $\frac{2 - \log 2}{\log 6}$

Answer: A



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71. The value of f at $x = 0$ so that function $f(x) = \frac{2^x - 2^{-x}}{x}$, $x \neq 0$ is continuous at $x = 0$ is

A. 0

B. e^4

C. $\log 4$

D. $\log 2$

Answer: C



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72. If the function $f(x)$ defined by

$$f(x) = \begin{cases} \frac{\log(1+ax) - \log(1-bx)}{x}, & \text{if } x \neq 0 \\ k, & \end{cases}$$

is continuous at $x = 0$, find k .

A. $\log a + \log b$

B. $\log a - \log b$

C. $a + b$

D. $a - b$

Answer: C



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73. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \frac{\log 100 + \log(0.01 + x)}{3x}, \text{ for } x \neq 0, \text{ then } f(0) =$$

A. $\frac{10}{3}$

B. $\frac{100}{3}$

C. $\frac{1}{3}$

D. 100

Answer: B



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74. For what value of k , the function defined by

$$f(x) = \frac{\log(1 + 2x) \sin x^0}{x^2} \text{ for } x \neq 0$$

$$= K \text{ for } x = 0$$

is continuous at $x = 0$?

A. 1

B. -1

C. 2

D. -2

Answer: B



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75. If $f(x) = \begin{cases} \log_{(1-3x)}(1+3x), & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$ is continuous at $x = 0$,

then k is equal to

A. -1

B. 1

C. 3

D. -3

Answer: A



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76. If $f(x)$ is continuous at $x = 7$, where $f(x) = \frac{\log x - \log 7}{x - 7}$, for $x \neq 7$, then $f(7) =$

A. 14

B. 7

C. $\frac{1}{14}$

D. $\frac{1}{7}$

Answer: D



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77. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{e^{5x} - e^{2x}}{\sin 3x}$, for $x \neq 0$ then $f(0) =$

A. 1

B. -1

C. 3

D. None of these

Answer: A



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78. Let $f(x) = \frac{(e^{kx} - 1) \cdot \sin Kx}{x^2}$ for $x \neq 0$; $= 4$, for $x = 0$ is continuous at $x = 0$ then k

A. 4

B. -2

C. 2

D. ± 2

Answer: D



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79. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{(e^{2x} - 1)\tan x}{x \sin x}$, for $x \neq 0$, then $f(0) =$

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

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

C. 2

D. -2

Answer: C



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80. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{(e^{3x} - 1)\sin x^\circ}{x^2}$, for $x \neq 0$, then $f(0) =$

A. $\frac{\pi}{180}$

B. $\frac{\pi}{60}$

C. $\frac{\pi}{90}$

D. 3

Answer: B



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81. if $f(x) = \frac{e^{x^2} - \cos x}{x^2}$, for $x \neq 0$ is continuous at $x = 0$, then value of $f(0)$ is

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

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

C. 1

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

Answer: A



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82. If $f(x)$ is continuous at $x = 0$, where $f(x) = \begin{cases} \frac{3^x - 3^{-x}}{\sin x}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$,
then $k =$

A. $\log 9$

B. $\log 3$

C. $\log 1$

D. $\log e$

Answer: A



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83. If $f(x)$ is continuous at $x = 0$, where $f(x) = \begin{cases} \frac{9^x - 9^{-x}}{\sin x}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$,
then $k =$

A. $\log 9$

B. $\log 81$

C. $2 \log 3$

D. $(\log 9)^2$

Answer: B



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84. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{10^x + 7^x - 14^x - 5^x}{1 - \cos 4x}$,

for $x \neq 0$, then $f(0) =$

A. $\frac{1}{4}(\log 2)\log\left(\frac{5}{7}\right)$

B. $\frac{1}{8}(\log 2)\log\left(\frac{5}{7}\right)$

C. $\frac{1}{4}(\log 2)\log\left(\frac{7}{5}\right)$

D. None of these

Answer: B



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85. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{(5^x - 2^x)x}{\cos 5x - \cos 3x}$, for $x \neq 0$, then $f(0) =$

A. $\frac{-1}{4} \log\left(\frac{2}{5}\right)$

B. $\frac{1}{4} \log\left(\frac{2}{5}\right)$

C. $\frac{-1}{8} \log\left(\frac{2}{5}\right)$

D. $\frac{1}{8} \log\left(\frac{2}{5}\right)$

Answer: D



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86. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{4^x - 2^{x+1} + 1}{1 - \cos x}$, for $x \neq 0$, then $f(0) =$

A. $(2 \log 2)^2$

B. $2(\log 2)^2$

C. $(\log 2)^2$

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

Answer: B



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87. If $f(x)$ is continuous at $x = \frac{\pi}{2}$, where $f(x) = \frac{3^{x - \frac{\pi}{2}} - 6^{x - \frac{\pi}{2}}}{\cos x}$, for $x \neq \frac{\pi}{2}$, then $f\left(\frac{\pi}{2}\right) =$

A. $\log 3$

B. $\log 6$

C. $\log 2$

D. $\log 18$

Answer: C



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88. If $f(x)$ is continuous at $x = a$, $a > 0$, where $f(x) = \begin{cases} \frac{a^x - x^a}{x^x - a^a}, & \text{for } x \neq a \\ -1 & \text{for } x = a \end{cases}$, then $a =$

A. e

B. $2e$

C. 1

D. 0

Answer: C



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89. The function $f(x)$ is continuous at the point $x=0$ where

$$f(x) = \frac{\log(1 + kx)}{\sin x}, \text{ for } x \neq 0$$

$= 5$ for $x=0$ then value of k is

A. 5

B. -5

C. $\frac{1}{5}$

D. $\frac{-1}{5}$

Answer: A



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90. For what value of k, the function defined by

$$f(x) = \begin{cases} \frac{\log(1+2x) \sin x^\circ}{x^2}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$$

is continuous at $x = 0$?

A. 2

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

C. $\frac{\pi}{90}$

D. $\frac{90}{\pi}$

Answer: C



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91. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{\log \sec^2 x}{x \sin x}$, for $x \neq 0$ then $f(0) =$

A. e

B. ± 1

C. -1

D. 1

Answer: D



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92. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \frac{\log(1+x^2) - \log(1-x^2)}{\sec x - \cos x}, \text{ for } x \neq 0, \text{ then } f(0) =$$

A. 0

B. 2

C. 1

D. -1

Answer: B



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93. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \frac{\log(1+x+x^2) + \log(1-x+x^2)}{\sin x}, \text{ for } x \neq 0, \text{ then } f(0) =$$

A. 0

B. 2

C. 1

D. -1

Answer: A



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94. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \frac{\log(2+x) - \log(2-x)}{\tan x}, \text{ for } x \neq 0, \text{ then } f(0) =$$

A. $\frac{1}{4}$

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

C. 2

D. 1

Answer: D



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95. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{(e^{3x} - 1)\sin x}{x \log(1+x)}$, for $x \neq 0$,

find $f(0)$.

A. 1

B. 3

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

D. $\frac{1}{3}$

Answer: B



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96. If $f(x) = \frac{(8^x - 1)^2}{\sin x \log\left(1 + \frac{x}{4}\right)}$ in $[-1, 1] - \{0\}$, then for removable discontinuity of f at $x = 0$, $f(0) =$

A. $4 \log 8$

B. $8 \log 2$

C. $4(\log 8)^2$

D. $8(\log 2)^2$

Answer: C



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97. If the function $f(x) = \frac{(4^{\sin x} - 1)^2}{x \cdot \log(1 + 2x)}$, for $x \neq 0$ is continuous at $x = 0$, find $f(0)$.

A. $\frac{1}{4}(\log 4)^2$

B. $\frac{1}{2}(\log 4)^2$

C. $2(\log 4)^2$

D. $2(\log 2)^2$

Answer: D



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98. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{(3^{\sin x} - 1)^2}{x \log(1 - x)}$, for $x \neq 0$, then $f(0) =$

A. $(\log 3)^2$

B. $\log 9$

C. $\frac{1}{2} \log 3$

D. $\log 3$

Answer: A



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99. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} \frac{(e^x - 1)^4}{\sin\left(\frac{x^2}{k^2}\right) \log\left(1 + \frac{x^2}{2}\right)}, & \text{for } x \neq 0 \\ 8, & \text{for } x = 0 \end{cases}, \text{ then } k =$$

A. 1

B. ± 2

C. 2

D. -2

Answer: B



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100. If $f(x) = \frac{e^x + e^{-x} - 2}{x \sin x}$, for $x \in \left[-\frac{\pi}{2}, \frac{\pi}{2} \right] - \{0\}$, then for f to be continuous in $\left[-\frac{\pi}{2}, \frac{\pi}{2} \right]$, $f(0) =$

A. $-e^2$

B. e^2

C. 1

D. None of these

Answer: C



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101. The function defined by $f(x) = \begin{cases} (1 + \tan^2 \sqrt{x})^{\frac{1}{2x}}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$, is continuous from right at point $x = 0$, then $k =$

A. e

B. e^2

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

D. None of these

Answer: C



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102. The function defined by

$$f(x) = \begin{cases} \left(x^2 + e^{\frac{1}{2-x}}\right)^{-1}, & x \neq 2 \\ k, & x = 2 \end{cases}$$

is continuous from right at the point

$x=2$, then k is equal to

A. 0

B. 4

C. $-\frac{1}{4}$

D. $\frac{1}{4}$

Answer: D



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103. Is the function defined by $f(x) = x^2 - \sin x + 5$ continuous at $x = \pi$?

A. f is discontinuous

B. f is continuous

C. $\lim_{x \rightarrow \pi^-} f(x) = \pi^2 - 5$

D. $\lim_{x \rightarrow \pi^+} f(x) = 5 - \pi^2$

Answer: B



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

A. $\lim_{x \rightarrow \frac{1}{2}^-} f(x) = \frac{-1}{2}$

B. $\lim_{x \rightarrow \frac{1}{2}^+} f(x) = \frac{-1}{2}$

C. f is continuous at $x = \frac{1}{2}$

D. f is discontinuous at $x = \frac{1}{2}$

Answer: C



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105. If $f(x) = \begin{cases} \frac{x^2-9}{x-3}, & \text{for } 0 < x < 3 \\ x+3, & \text{for } 3 \leq x < 6 \\ \frac{x^2-9}{x+3}, & \text{for } 6 \leq x < 9 \end{cases}$, then f is

A. continuous at $x = 3, x = 6$

B. discontinuous at $x = 3, x = 6$

C. continuous at $x = 6$ and discontinuous at $x = 3$

D. continuous at $x = 3$ and discontinuous at $x = 6$

Answer: D



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106. If $f(x) = \begin{cases} \frac{\sin 2x}{\sqrt{1 - \cos 2x}}, & \text{for } 0 < x < \frac{\pi}{2} \\ \frac{\cos x}{\pi - 2x}, & \text{for } \frac{\pi}{2} < x < \pi \end{cases}$, then

A. f is discontinuous at $x = \frac{\pi}{2}$

B. f is continuous at $x = \frac{\pi}{2}$

C. $\lim_{x \rightarrow \frac{\pi}{2}^-} f(x) = \frac{1}{2}$

D. $\lim_{x \rightarrow \frac{\pi}{2}^+} f(x) = 0$

Answer: A



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

A. $\lim_{x \rightarrow 2^-} f(x) = 7$

B. $\lim_{x \rightarrow 2^+} f(x) = 1$

C. f has removable discontinuity at $x = 2$

D. f has irremovable discontinuity at $x = 2$

Answer: D



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108. If $f(x) = \begin{cases} x \sin x, & \text{for } 0 < x \leq \frac{\pi}{2} \\ \frac{\pi}{2} \sin(\pi + x), & \text{for } \frac{\pi}{2} < x < \pi \end{cases}$, then

A. $f(x)$ is discontinuous at $x = \frac{\pi}{2}$

B. $f(x)$ is continuous at $x = \frac{\pi}{2}$

C. $f(x)$ is continuous at $x = 0$

D. $f(x)$ is discontinuous at $x = 0$

Answer: A



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109. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} \frac{\sin x}{x} + \cos x, & \text{for } x > 0 \\ \frac{4(1 - \sqrt{1-x})}{x}, & \text{for } x < 0 \end{cases}, \text{ then } f(0) =$$

A. 2

B. -2

C. 4

D. None of these

Answer: A



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110. If $f(x) = \begin{cases} x + 2, & \text{if } x \leq 4 \\ x + 4, & \text{if } x > 4 \end{cases}$, then

A. $\lim_{x \rightarrow 4^+} f(x) = 6$

B. $\lim_{x \rightarrow 4^-} f(x) = 8$

C. f has removable discontinuity

D. f has irremovable discontinuity

Answer: D



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111. If $f(x) = \begin{cases} 2x, & \text{if } x < 2 \\ 2, & \text{if } x = 2 \\ x^2, & \text{if } x > 2 \end{cases}$, then

A. $\lim_{x \rightarrow 2^-} f(x) = -4$

B. $\lim_{x \rightarrow 2^+} f(x) = -4$

C. f has irremovable discontinuity

D. f has removable discontinuity

Answer: D



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112. If $f(x) = \begin{cases} x - 1, & \text{for } 1 \leq x < 2 \\ 2, & \text{for } x = 2 \\ 2x - 3, & \text{for } 2 < x < 3 \end{cases}$, then f has removable

discontinuity at $x = 2$, if $f(2) =$

A. 2

B. 3

C. 1

D. -1

Answer: C



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113. If $f(x) = \begin{cases} x^2, & \text{for } x \leq 1 \\ x + 3, & \text{for } x > 1 \end{cases}$, then at $x = 1$

A. $\lim_{x \rightarrow 1^-} f(x) = 4$

B. $\lim_{x \rightarrow 1^+} f(x) = 1$

C. f has removable discontinuity

D. f has irremovable discontinuity

Answer: D



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114. If $f(x) = \sqrt{x-2}$, for $2 < x < 4$, then $f(x)$ is

- A. continuous in $(2, 4)$ except at $x = 3$
- B. discontinuous in $(2, 4)$ except at $x = 3$
- C. discontinuous in $(2, 4)$
- D. continuous in $(2, 4)$

Answer: D



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115. If $f(x) = \begin{cases} 1-x, & \text{for } 0 < x \leq 1 \\ \frac{1}{2}, & \text{for } x = 0 \end{cases}$, then in $[0, 1]$

- A. $f(x)$ is not continuous
- B. $f(x)$ is continuous
- C. $f(x)$ is continuous at $x = 0$
- D. $f(x)$ is continuous at $x = 1$

Answer: A



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116. If $f(x) = \begin{cases} 3x + 5, & \text{for } 0 \leq x < 3 \\ 2x + 8, & \text{for } 3 \leq x < 5 \\ x + 13, & \text{for } 5 \leq x \leq 10 \end{cases}$, then

- A. $f(x)$ is discontinuous in its domain
- B. $f(x)$ is continuous in its domain
- C. $f(x)$ is continuous in its domain except at $x = 3$
- D. $f(x)$ is continuous in its domain except at $x = 5$

Answer: B



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117. If $f(x) = \begin{cases} \frac{\sin x}{x}, & \text{for } x < 0 \\ x + 1, & \text{for } x \geq 0 \end{cases}$, then

- A. f is continuous on its domain
- B. f is discontinuous on its domain
- C. f is continuous on its domain except $x = 0$
- D. f is discontinuous on its domain except $x = 0$

Answer: A



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118. If $f(x) = \begin{cases} \frac{2x+5}{x+1}, & \text{for } 0 \leq x < 2 \\ 4x - 5, & \text{for } 2 \leq x \leq 4 \\ \frac{x^2+2}{x-5}, & \text{for } 4 < x \leq 6, x \neq 5 \end{cases}$ then

- A. f is continuous on its domain
- B. f is continuous on its domain except $x = 5$
- C. f is continuous on its domain except $x = 4$
- D. f is continuous on its domain except $x = 2$

Answer: C

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119. If $f(x) = \begin{cases} \frac{\sin 2x}{\sqrt{1 - \cos 2x}}, & \text{for } 0 < x \leq \frac{\pi}{2} \\ \frac{\cos x}{\pi - 2x}, & \text{for } \frac{\pi}{2} < x \leq \pi \end{cases}$

A. f is continuous on its domain except $x = \frac{\pi}{2}$

B. f is continuous on its domain

C. f is discontinuous on its domain

D. f is continuous on its domain except $x = 0$

Answer: A

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120. If $f(x) = \begin{cases} x, & \text{for } 0 \leq x < 1 \\ 2, & \text{for } x = 1 \\ x + 1, & \text{for } 1 < x \leq 2 \end{cases}$, then f is

A. f is continuous at $x = 1$

B. f is discontinuous at $x = 1$

C. $\lim_{x \rightarrow 1^-} f(x) = 2$

D. $\lim_{x \rightarrow 1^+} f(x) = 1$

Answer: B



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121. If $f(x) = \frac{x^3 + 3x + 5}{x^3 - 3x + 2}$ in $[0, 5]$, then f is

A. continuous on its domain except at $x = 1, x = -2$

B. continuous on its domain except at $x = 1$

C. continuous on its domain except at $x = -2$

D. continuous on its domain

Answer: B



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122. If $f(x) = \frac{x+1}{(x-2)(x-5)}$, then in $[4, 6]$

- A. f is discontinuous
- B. f is continuous
- C. f is continuous except at $x = 2$
- D. f is continuous except at $x = 5$

Answer: D



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123. If $f(x) = \frac{x+1}{(x-2)(x-5)}$, then in $[0, 1]$

- A. f is continuous
- B. f is discontinuous
- C. f is continuous except at $x = 0$
- D. f is continuous except at $x = 1$

Answer: A



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124. If $f(x) = \begin{cases} x, & \text{for } x \geq 0 \\ x^2, & \text{for } x < 0 \end{cases}$, then f is

- A. continuous on \mathbb{R} except at $x = 0$
- B. continuous on \mathbb{R}
- C. discontinuous on \mathbb{R} except at $x = 0$
- D. continuous on \mathbb{R}^+ only

Answer: B



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125. If $f(x) = \begin{cases} x^2 - 4, & \text{for } 0 \leq x \leq 2 \\ 2x + 3, & \text{for } 2 < x \leq 4 \\ x^2 - 5, & \text{for } 4 < x \leq 6 \end{cases}$, then

A. f is continuous on $[0, 6]$

B. f is discontinuous on $[0, 6]$

C. f is continuous on $[0, 6]$ except at $x = 2$

D. f is continuous on $[0, 6]$ except at $x = 4$

Answer: C



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126. If $f(x) = \begin{cases} \frac{1}{x+1}, & \text{for } 2 \leq x \leq 4 \\ \frac{x+1}{x-3}, & \text{for } 4 < x \leq 6 \end{cases}$, then

A. f is discontinuous on $[2, 6]$

B. f is continuous on $[2, 6]$

C. f is continuous on $[2, 6]$ except at $x = 3$

D. f is continuous on $[2, 6]$ except at $x = 4$

Answer: D



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127. If $f(x) = \begin{cases} 3, & \text{if } 0 \leq x \leq 1 \\ 4, & \text{if } 1 < x < 3 \\ 5, & \text{if } 3 \leq x \leq 10 \end{cases}$, then

- A. f is continuous on $[0, 10]$ except at $x = 1, 3$
- B. f is continuous on $[0, 10]$ except at $x = 1$
- C. f is continuous on $[0, 10]$ except at $x = 3$
- D. f is continuous on $[0, 10]$

Answer: A



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

- A. f is discontinuous on its domain
- B. f is continuous on its domain

C. f is continuous on its domain except at $x = -1$

D. f is continuous on its domain except at $x = 1$

Answer: B



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$$129. f(x) = \begin{cases} |x| + 3, & \text{if } x \leq -3 \\ -2x, & \text{if } -3 < x < 3 \\ 6x + 2, & \text{if } x \geq 3 \end{cases}$$

A. f is continuous on its domain except at $x = -3$

B. f is continuous on its domain except at $x = 3$

C. f is continuous on its domain except at $x = -3, 3$

D. f is continuous on its domain

Answer: C



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130. If $f(x) = \begin{cases} 2x, & \text{for } x < 0 \\ 2x + 1, & \text{for } x \geq 0 \end{cases}$, then

- A. $f(|x|)$ is continuous at $x = 0$
- B. $f(x)$ is discontinuous at $x = 0$
- C. $f(x)$ is continuous at $x = 0$
- D. $f(|x|)$ is discontinuous at $x = 0$

Answer: B



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131. Function $f(x) = \begin{cases} x - 1, & x < 2 \\ 2x - 3, & x \geq 2 \end{cases}$ is a continuous function

- A. for $x = 2$ only
- B. for all real values of x
- C. for all real values of x such that $x \neq 2$
- D. for all integral values of x only

Answer: B



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132. If $f(x) = \frac{x^3 - 8}{x^2 + x - 20}$, then

- A. f is continuous on \mathbb{R}
- B. f is continuous on $\mathbb{R} - (-5, 4)$
- C. f is continuous on $\mathbb{R} - \{-5, 4\}$
- D. f is continuous on $\mathbb{R} - [-5, 4]$

Answer: C



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133. If $f(x) = \begin{cases} \frac{x^2 - 3x + 2}{x - 3}, & \text{for } 0 \leq x < 4 \\ \frac{x^2 - 1}{x - 2}, & \text{for } 4 \leq x \leq 6 \end{cases}$, then on $[0, 6]$

- A. f is continuous except at $x = 2$

B. f is continuous except at $x = 3$

C. f is continuous except at $x = 4$

D. f is continuous except at $x = 3$ and $x = 4$

Answer: D



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134. If the function

$$f(x) = k + x, \text{ For } x < 1$$

$$= 4x + 3, \text{ For } x \geq 1$$

is continuous at $x = 1$ then $k = \dots\dots$

A. 7

B. 8

C. 6

D. -6

Answer: C



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135. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} x^2 + 1, & \text{for } x \geq 0 \\ 2\sqrt{x^2 + 1} + k, & \text{for } x < 0 \end{cases}, \text{ then } k =$$

A. 3

B. -2

C. -1

D. 1

Answer: C



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136. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} k(x^2 - 2), & \text{for } x \leq 0 \\ 4x + 1, & \text{for } x > 0 \end{cases}, \text{ then } k =$$

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

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

C. 2

D. -2

Answer: B



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137. If f is continuous at $x = 0$, where $f(x) = x^2 + \alpha$, $x \geq 0$,

$$f(x) = 2\sqrt{x^2 + 1} + \beta, x < 0. \text{ Find } \alpha \text{ and } \beta \text{ given that } f\left(\frac{1}{2}\right) = 2$$

A. $\alpha = \frac{-1}{4}, \beta = \frac{7}{4}$

B. $\alpha = \frac{-7}{4}, \beta = \frac{1}{4}$

$$\text{C. } \alpha = \frac{1}{4}, \beta = \frac{-7}{4}$$

$$\text{D. } \alpha = \frac{7}{4}, \beta = \frac{-1}{4}$$

Answer: D



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138. If $f(x) = \frac{x^2 - 9}{x - 3} + \alpha$, for $x > 3$

$$= 5, \text{ for } x = 3$$

$$= 2x^2 + 3x + \beta, \text{ for } x < 3$$

is continuous at $x = 3$, find α and β .

$$\text{A. } \alpha = -1, \beta = 22$$

$$\text{B. } \alpha = 1, \beta = -22$$

$$\text{C. } \alpha = -1, \beta = -22$$

$$\text{D. } \alpha = 1, \beta = 22$$

Answer: C

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139. If the function $f(x) = \begin{cases} 5, & x \leq 2 \\ ax + b, & 2 < x \leq 10 \\ 21, & x > 10 \end{cases}$

continuous, find the values of a and b

A. $a = 2, b = 1$

B. $a = -2, b = -1$

C. $a = 2, b = -1$

D. $a = -2, b = 1$

Answer: A

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140. If $f(x)$ is continuous at $x = 1$, where $f(x) = \begin{cases} kx^2, & \text{for } x \geq 1 \\ 4, & \text{for } x < 1 \end{cases}$,

then $k =$

A. 2

B. 4

C. -2

D. ± 2

Answer: B



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141. If $f(x)$ is continuous on $[0, 8]$, where

$$f(x) = \begin{cases} x^2 + ax + 6, & \text{for } 0 \leq x < 2 \\ 3x + 2, & \text{for } 2 \leq x \leq 4 \\ 2ax + 5b, & \text{for } 4 < x \leq 8 \end{cases}, \text{ then}$$

A. $a = -1, b = \frac{22}{5}$

B. $a = -1, b = \frac{-8}{5}$

C. $a = -1, b = \frac{-22}{5}$

D. $a = 1, b = \frac{8}{5}$

Answer: A



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142. If $f(x)$ is continuous in $[0, 3]$, where

$$f(x) = \begin{cases} 3x - 4, & \text{for } 0 \leq x \leq 2 \\ 2x + k, & \text{for } 2 < x \leq 3 \end{cases}, \text{ then } k =$$

A. 6

B. -14

C. 2

D. -2

Answer: D

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143. If $f(x)$ continuous on its domain, where

$$f(x) = \begin{cases} 6, & \text{for } x \leq 2 \\ ax + b, & \text{for } 2 < x < 10 \\ 22, & \text{for } x \geq 10 \end{cases}, \text{ then}$$

A. $a = 3, b = 1$

B. $a = 2, b = -1$

C. $a = 3, b = -1$

D. $a = 2, b = 2$

Answer: D



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144. If $f(x)$ is continuous on $0 - 4, 2]$, defined as

$$f(x) = 6b - 3ax, \text{ for } -4 \leq x < -2$$

$$= 4x + 1, \text{ for } -2 \leq x \leq 2,$$

find the value of $a + b$.

A. $\frac{7}{6}$

B. $\frac{-7}{6}$

C. $\frac{9}{2}$

D. $\frac{-9}{2}$

Answer: B



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145. If $f(x)$ is continuous at $x=3$, then $f(x) = ax + 1$, for $x \leq 3$
 $= bx + 3$, for $x > 3$ then

A. $a + b = \frac{2}{3}$

B. $a + b = \frac{-2}{3}$

C. $a - b = \frac{2}{3}$

D. $a - b = \frac{-2}{3}$

Answer: C



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146. If $f(x)$ is continuous in $[-2, 2]$, where $f(x) = \begin{cases} x + a, & \text{for } x < 0 \\ x, & \text{for } 0 \leq x < 1, \\ b - x, & \text{for } x \geq 1 \end{cases}$

then $a + b =$

A. 0

B. -2

C. ± 2

D. 2

Answer: D



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147. If $f(x) = \begin{cases} \frac{\sqrt{1+kx} - \sqrt{1-kx}}{x} & \text{for } 1 \leq x < 0 \text{ and } 2x^2 + 3x - 2f \text{ or } 0 \leq x \leq 1 \end{cases}$ is continuous at $x = 0$ then k

A. -1

B. -2

C. -3

D. -4

Answer: B



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148. If the function $f: R \rightarrow R$ given by

$f(x) = \begin{cases} x + a, & \text{if } x \leq 1 \\ 3 - x^2, & \text{if } x > 1 \end{cases}$ is continuous at $x = 1$, then a is equal to

A. 2

B. 1

C. 4

D. 3

Answer: B



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149. If $f(x) = \begin{cases} ax^2 - b, & \text{for } 0 \leq x < 1 \\ 2, & \text{for } x = 1 \\ x + 1, & \text{for } 1 < x \leq 2 \end{cases}$ is continuous at $x = 1$, then

the most suitable values of a, b are

A. $a = 2, b = -2$

B. $a = -1, b = -1$

C. $a = 1, b = 1$

D. $a = 1, b = -1$

Answer: D



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150. If the derivative of the function

$f(x) = \begin{cases} ax^2 + b, & x < -1 \\ bx^2 + ax + 4, & x \geq -1 \end{cases}$ is everywhere continuous, then-

A. $a = 3, b = 2$

B. $a = 2, b = 3$

C. $a = -2, b = -3$

D. $a = -3, b = -2$

Answer: B



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151. If $f(x)$ is continuous at $x = 2$, where $f(x) = \begin{cases} 4x - 3, & \text{for } x < 2 \\ kx + 7, & \text{for } x > 2 \end{cases}$,
then $k =$

A. -1

B. 1

C. -6

D. 6

Answer: A



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152. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} \frac{1 - \cos 4x}{x^2}, & \text{for } x < 0 \\ k, & \text{for } x = 0 \\ \frac{\sqrt{x}}{\sqrt{16 + \sqrt{x}} - 4}, & \text{for } x > 0 \end{cases}, \text{ then } k =$$

A. 2

B. 0

C. 4

D. 8

Answer: D



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153. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} \frac{\sin 4x}{5x} + a, & \text{for } x > 0 \\ x + 4 - b, & \text{for } x < 0 \\ 1, & \text{for } x = 0 \end{cases}, \text{ then}$$

A. $a = \frac{1}{5}, b = 3$

B. $a = \frac{-1}{5}, b = -3$

C. $a = \frac{1}{5}, b = -3$

D. $a = \frac{-1}{5}, b = 3$

Answer: A



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154. If $f(x) = \frac{\sin \pi x}{x - 1} + a$, for $x < 1$

$= 2\pi$, for $x = 1$

$= \frac{1 + \cos \pi x}{\pi}(1 - x)^2 + b$, for $x > 1$

is continuous at $x = 1$, find a and b

A. $a = \pi, b = \frac{3\pi}{2}$

B. $a = 3\pi, b = \frac{3\pi}{2}$

C. $a = \pi, b = \frac{5\pi}{2}$

D. $a = 3\pi, b = \frac{5\pi}{2}$

Answer: B



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155. Let $f(x) = \begin{cases} \sin 2x & 0 < x \leq x\pi/6 \\ ax + b & \pi/6 < x < 1 \end{cases}$ If $f(x)$ and $f'(x)$ are continuous, then

A. $a = -2, b = \frac{\sqrt{3}}{2} + \frac{\pi}{3}$

B. $a = 2, b = \frac{\sqrt{3}}{2} - \frac{\pi}{3}$

C. $a = -1, b = \frac{\sqrt{3}}{2} + \frac{\pi}{6}$

D. $a = 1, b = \frac{\sqrt{3}}{2} - \frac{\pi}{6}$

Answer: D



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156. Determine the values of a, b, c for which the function

$$f(x) = \begin{cases} \frac{\sin(a+1)x + \sin x}{xc, f \otimes = 0}, & f \text{ or } x < 0 \\ \frac{\sqrt{x+bx^2} - \sqrt{x}}{bx^{\frac{3}{2}}}, & f \text{ or } x > 0 \end{cases}$$

A. $a = -2, b = 0, c = 0$

B. $a = -2, b = R, c = 0$

C. $a = -2, b \neq 0, c = 0$

D. $a = -2, b = 0, c \neq 0$

Answer: C



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157. Determine the values of a, b, c for which the function

$$f(x) = \begin{cases} \frac{\sin(a+1)x + \sin x}{xc, f \otimes = 0}, & f \text{ or } x < 0 \\ \frac{\sqrt{x+bx^2} - \sqrt{x}}{bx^{\frac{3}{2}}}, & f \text{ or } x > 0 \end{cases}$$

A. $a = -2, b = R, c = 0$

B. $a = -2, b \neq 0, c = 0$

C. $a = -\frac{3}{2}, b = R, c = \frac{1}{2}$

D. $a = -\frac{3}{2}, b = R - \{0\}, c = \frac{1}{2}$

Answer: D



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158. If $f(x)$ is continuous on $[-2, 2]$, where

$$f(x) = \begin{cases} \frac{\sin ax}{x} + 2, & \text{for } -2 \leq x < 0 \\ 3x + 5, & \text{for } 0 \leq x \leq 1 \\ \sqrt{x^2 + 8} - b, & \text{for } 1 < x < 2 \end{cases}, \text{ then } a + b =$$

A. -15

B. 0

C. 2

D. -2

Answer: D



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159. Find the values of a and b so that the function

$$f(x) = \begin{cases} x + a\sqrt{2}\sin x, & 0 \leq x \leq \pi/4 \\ 2x \cot x + b, & \pi/4 \leq x \leq \pi/2 \\ a \cot 2x - b \sin x, & \pi/2 < x \leq \pi \end{cases}$$

is continuous for $0 \leq x \leq \pi$.

A. $a = \frac{-\pi}{6}, b = \frac{\pi}{12}$

B. $a = \frac{\pi}{6}, b = \frac{-\pi}{12}$

C. $a = \frac{-\pi}{6}, b = \frac{-\pi}{12}$

D. $a = \frac{\pi}{6}, b = \frac{\pi}{12}$

Answer: B



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160. Let $f(x) = \begin{cases} -2 \sin x & \text{for } -\pi \leq x \leq -\frac{\pi}{2} \\ a \sin x + b & \text{for } -\frac{\pi}{2} < x < \frac{\pi}{2} \\ \cos x & \text{for } \frac{\pi}{2} \leq x \leq \pi \end{cases}$. If f is continuous

on $[-\pi, \pi]$, then find the values of a and b .

A. $\alpha = 1, \beta = 1$

B. $\alpha = -1, \beta = -1$

C. $\alpha = -1, \beta = 1$

D. $\alpha = 1, \beta = -1$

Answer: C



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161. If the function $f(x)$ is continuous in the interval $[-2, 2]$. find the values of a and b where

$$f(x) = \frac{\sin x}{x} - 2 \quad , \text{for } -2 \leq x < 0$$

$$= 2x + 1 \quad , \text{for } 0 \leq x \leq 1$$

$$= 2b\sqrt{x^2 + 3} - 1 \quad , \text{for } 1 < x \leq 2$$

A. 3

B. 1

C. 4

D. 2

Answer: C



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162. If $f(x)$ is continuous in $(-\infty, 6)$, where

$$f(x) = \begin{cases} 1 + \sin\left(\frac{\pi x}{2}\right), & \text{for } -\infty < x \leq 1 \\ ax + b, & \text{for } 1 < x < 3 \\ 6 \tan\left(\frac{\pi x}{12}\right), & \text{for } 3 \leq x < 6 \end{cases}, \text{ then}$$

A. $a = 2, b = 0$

B. $a = 0, b = 2$

C. $a = 1, b = 1$

D. $a = 2, b = 1$

Answer: A



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163. If $f(x) = \begin{cases} ax + 1, & x \leq \frac{\pi}{2} \\ \sin x + b, & x > \frac{\pi}{2} \end{cases}$ is continuous, then

A. $\frac{a\pi}{2} = b$

B. $\frac{b\pi}{2} = a_a$

C. $a = b = \frac{\pi}{2}$

D. $a = b = \frac{\pi}{2} + 1$

Answer: A



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164. If $f(x) = \begin{cases} \frac{e^{\frac{1}{x}} - 1}{e^{\frac{1}{x}} + 1}, & \text{for } x \neq 0 \\ 1, & \text{for } x = 0 \end{cases}$, then f is

A. continuous at $x = 0$

B. discontinuous at $x = 0$

C. continuous if $f(0) = -1$

D. discontinuous if $f(0) = -1$

Answer: B



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165. If $f(x)$ is continuous at $x = 0$, where $f(x) \begin{cases} \frac{1}{1+e^{\frac{1}{x}}}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$, then $k =$

A. 1

B. 0

C. -1

D. does not exists

Answer: D



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166. The function $f(x) = k (k \in R)$ at every $x \in R$ is

A. continuous on R^+

B. continuous on R

C. discontinuous on R^+

D. discontinuous on R

Answer: B



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167. The composition of two continuous functions is a continuous function.

A. discontinuous

B. continuous

C. continuous for some real numbers

D. discontinuous for some real numbers

Answer: B



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168. If $f(x) = \sin x$, then f is

- A. discontinuous for all $x \in R$
- B. continuous for all $x \in R^+$
- C. continuous for all $x \in R^-$
- D. continuous for all $x \in R$

Answer: D



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169. If $f(x) = \sin x^2$, then f is

- A. continuous for all $x \in R$
- B. discontinuous for all $x \in R$
- C. continuous for only $x \in R^+$

D. continuous for only $x \in R^-$

Answer: A



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170. If $f(x) = a^x$, $a > 0$, then f is

A. continuous for all $x \in R^+$

B. continuous for all $x \in R^-$

C. continuous for all $x \in R$

D. discontinuous for all $x \in R$

Answer: C



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171. Discuss the continuity of the function $\log_c x$, where $c > 0$, $x > 0$.

A. continuous in $(-\infty, \infty)$

B. continuous in $(0, \infty)$

C. discontinuous in $(-\infty, \infty)$

D. discontinuous in $(0, \infty)$

Answer: B



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172. The rational function $f(x) = \frac{g(x)}{h(x)}$, $h(x) \neq 0$ is

A. continuous

B. discontinuous for integer values only

C. continuous for integer values only

D. continuous for imaginary values only

Answer: A



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173. The function $f(x) = |x|$ is

- A. continuous on \mathbb{R}
- B. discontinuous on \mathbb{R}
- C. continuous on only \mathbb{R}^+
- D. discontinuous only \mathbb{R}^+

Answer: A



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174. The function $f(x) = [\cos x]$ is

- A. continuous on \mathbb{R}
- B. discontinuous on \mathbb{R}
- C. continuous on only \mathbb{R}^+

D. discontinuous only R^+

Answer: A



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175. If $f(x) = |x|$, then at $x = 0$

A. discontinuous

B. continuous

C. $\lim_{x \rightarrow 0} f(x) = 1$

D. $\lim_{x \rightarrow 0} f(x) = -1$

Answer: B



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176. If $f(x)$ is continuous at $x = 3$, where $f(x) = \begin{cases} |x - 3|, & \text{for } x \neq 3 \\ k, & \text{for } x = 3 \end{cases}$, then $k =$

A. 1

B. 0

C. -1

D. does not exist

Answer: B



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177. If $f(x) = [x]$, where $[x]$ is the greatest integer not greater than x , in $(-4, 4)$, then $f(x)$ is

A. discontinuous at $x = 0$, only in $(-4, 4)$

B. continuous at $x = 0$ only in $(-4, 4)$

C. discontinuous at every integral point of $(-4, 4)$

D. continuous at every integral point of $(-4,4)$

Answer: C



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178. If $f(x) = |(1+x)|x|$, then f is

A. discontinuous for all $x \in R$

B. continuous for all $x \in R$

C. continuous for all $x \in R^+$

D. continuous for all $x \in R^-$

Answer: B



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179. If $f(x) = |x| + |x - 1|$, then in $[-1, 2]$

A. f is continuous except at $x = 0$

B. f is continuous except at $x = 1$

C. f is continuous

D. f is discontinuous

Answer: C



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180. The function $f(x) = x + |x|$ is continuous for

A. only $x > 0$

B. $x \in (-\infty, \infty) - \{0\}$

C. $x \in (-\infty, \infty)$

D. no values of x

Answer: C



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181. The function $f(x) = |x| \forall x \in R$ is

- A. continuous for all $x \in R^-$
- B. continuous for all $x \in R^+$
- C. continuous for all $x \in R$
- D. discontinuous for all $x \in R$

Answer: C



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182. If $f(x) = 2x - |x|$, then at $x = 0$

- A. f is continuous
- B. f is discontinuous
- C. $\lim_{x \rightarrow 0^-} f(x) = 3$

D. $\lim_{x \rightarrow 0^+} f(x) = 1$

Answer: A



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183. If $f(x) = \begin{cases} \frac{x}{|x|}, & \text{for } x \neq 0 \\ c, & \text{for } x = 0 \end{cases}$, then f is

A. continuous at $x = 0$

B. discontinuous at $x = 0$

C. continuous if $f(0) = 1$

D. continuous if $f(0) = -1$

Answer: B



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184. If $f(x) = \begin{cases} \frac{|x|}{x}, & \text{for } x \neq 0 \\ 1, & \text{for } x = 0 \end{cases}$, then

A. $\lim_{x \rightarrow 1^-} f(x) = 1$

B. $\lim_{x \rightarrow 1^+} f(x) = -1$

C. f is discontinuous at origin

D. f is continuous at origin

Answer: C



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185. If $f: R \rightarrow R$ is defined by $f(x) = [x - 3] + |x - 4|$ for $x \in R$, then

$$\lim_{x \rightarrow 3^-} f(x) =$$

A. 0

B. -1

C. -2

D. 1

Answer: A

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186. If $f(x) = \begin{cases} \frac{\cot x - \cos x}{(\pi - 2x)^3}, & \text{for } x \neq \frac{\pi}{2} \\ k, & \text{for } x = \frac{\pi}{2} \end{cases}$ is continuous at $x = \frac{\pi}{2}$, where ,

then $k =$

A. $\frac{1}{4}$

B. $\frac{1}{24}$

C. $\frac{1}{16}$

D. None of these

Answer: C

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187. If $f(x) = \log(\sec^2 x)^{\cot^2 x}$ for $x \neq 0$ for $x=0$ is continuous at $x=0$, then

K is

A. e^{-1}

B. 1

C. e

D. 0

Answer: B



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188. The function $f(x) = \frac{2x^2 + 7}{x^3 + 3x^2 - x - 3}$ is discontinuous for

A. $x = 1$ only

B. $x = 1, -1$ only

C. $x = 1, -1, -3$ and other values of x

D. $x = 1, -1, -3$ only

Answer: D



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189. If $f(u) = \frac{1}{u^2 + u - 2}$, where $u = \frac{1}{x - 1}$, then the points of discontinuity of f are $x = \dots$

A. $x = 2, \frac{1}{2}$

B. $x = 1, 2, \frac{1}{2}$

C. $x = 2, \frac{-1}{2}$

D. $x = 1, 2, \frac{-1}{2}$

Answer: B



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190. If $f(x)$ is continuous at $x = 3$, where $f(x) = \frac{x^2 - 7x + 12}{x^2 - 5x + 6}$, for $x \neq 3$, then $f(3) =$

A. -1

B. 1

C. $\frac{1}{5}$

D. $\frac{7}{5}$

Answer: A



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191. If $f(x)$ is continuous for all x , where $f(x) = \begin{cases} \frac{x^2 - 7x + 12}{(x - 2)^2}, & \text{for } x \neq 2 \\ k, & \text{for } x = 2 \end{cases}$, then $k =$

A. 7

B. -7

C. ± 7

D. 14

Answer: A



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192. If $f(x)$ is continuous at $x = 2$, where

$$f(x) = \begin{cases} \frac{x^2 - (a+2)x + a}{x-2}, & \text{for } x \neq 2 \\ 2, & \text{for } x = 2 \end{cases}, \text{ then } a =$$

A. 2

B. -1

C. 1

D. 0

Answer: D



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193. If $f(x)$ is continuous at $x = 2$, where $f(x) = \frac{(x^2 - x - 2)^{20}}{(x^3 - 12x + 16)^{10}}$,

for $x \neq 2$, then $f(2) =$

A. $\frac{3^{20}}{2^{10}}$

B. $\frac{3^{10}}{2^{20}}$

C. $\left(\frac{3}{2}\right)^{10}$

D. $\left(\frac{3}{2}\right)^{20}$

Answer: C



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194. If $f(x)$ is continuous at $x = -2$, where

$$f(x) = \frac{2}{x+2} + \frac{1}{x^2 - 2x + 4} - \frac{24}{x^3 + 8}, \quad \text{for } x \neq -2, \quad \text{then}$$

$$f(-2) =$$

A. $\frac{-1}{4}$

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

C. $\frac{11}{12}$

D. $\frac{-11}{12}$

Answer: D



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195. If $f(x)$ is continuous at $x = 1$, where $f(x) = \frac{x^n - 1}{x - 1}$, for $x \neq 1$, then $f(1) =$

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

B. $\frac{1}{n(n-1)}$

C. n

D. $n(n-1)$

Answer: C



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196. If $f(x)$ is continuous at $x = 1$, where

$$f(x) = \left(\frac{x + 3x^2 + 5x^3 + \dots + (2n-1)x^n - n^2}{x-1} \right), \text{ for } x \neq 1, \text{ then}$$

$$f(1) =$$

A. $\frac{n(n+1)(2n-1)}{6}$

B. $\frac{n(n+1)(2n-1)}{3}$

C. $\frac{n(n+1)(4n-1)}{6}$

D. $\frac{n(n+1)(4n-1)}{3}$

Answer: C



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197. If $f(x)$ is continuous at $x = 3$, where $f(x) = \begin{cases} \frac{x^2-9}{x-3} & , \text{ for } x \neq 3 \\ 2x + k & , \text{ otherwise} \end{cases}$, then $k =$

A. 0

B. 3

C. -6

D. $\frac{1}{6}$

Answer: A



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198. If $f(x)$ is continuous at $x = 16$, where

$$f(x) = \begin{cases} \frac{x^8 - (256)^4}{x^4 - (16)^4}, & \text{for } x \neq 16 \\ k, & \text{for } x = 16 \end{cases}, \text{ then } k =$$

A. $(16)^4$

B. $2(16)^4$

C. $4(16)^4$

D. $3(16)^4$

Answer: B



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199. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{(27 - 2x)^{\frac{1}{3}} - 3}{9 - 3(243 + 5x)^{\frac{1}{5}}}$,

for $x \neq 0$ then $f(0) =$

A. -2

B. 2

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

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

Answer: B



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200. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{\sqrt{1+x} - \sqrt[3]{1+x}}{x}$,
for $x \neq 0$, then $f(0) =$

A. $\frac{1}{3}$

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

C. $\frac{5}{6}$

D. $\frac{1}{6}$

Answer: D



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201. If $f(x)$ is continuous at $x = 4$, where $f(x) = \frac{x^4 - 64x}{\sqrt{x^2 + 9} - 5}$, for $x \neq 4$, then $f(4) =$

A. 120

B. 240

C. 120

D. -240

Answer: B



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202. If $f(x) = \frac{\sqrt{a^2 - ax + x^2} - \sqrt{a^2 + ax + x^2}}{\sqrt{a+x} - \sqrt{a-x}}$ is continuous at $x = 0$ then $f(0)$

A. $-a\sqrt{a}$

B. $a\sqrt{a}$

C. $-\sqrt{a}$

D. \sqrt{a}

Answer: C



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203. If $f(x)$ is continuous at $x = 2a$, where

$$f(x) = \frac{\sqrt{x} - \sqrt{2a} + \sqrt{x - 2a}}{\sqrt{x^2 - 4a^2}}, \text{ for } x \neq 2a, \text{ then } f(2a) =$$

A. $2\sqrt{a}$

B. $2a$

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

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

Answer: C



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204. If $f(x)$ is continuous at $x = \sqrt{2}$, where

$$f(x) = \frac{\sqrt{3+2x} - (\sqrt{2} + 1)}{x^2 - 2}, \text{ for } x \neq \sqrt{2}, \text{ then } f(\sqrt{2}) =$$

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

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

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

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

Answer: A



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205. If $f(x)$ is continuous at $x = 5$, where $f(x) = \frac{\sqrt{3 + \sqrt{4 + x}} - \sqrt{6}}{x - 5}$,

for $x \neq 5$, then $f(5) =$

A. $\frac{1}{2\sqrt{6}}$

B. $\frac{1}{3\sqrt{6}}$

C. $\frac{1}{6\sqrt{6}}$

D. $\frac{1}{12\sqrt{6}}$

Answer: D



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206. If $f(x)$ is continuous at $x = 0$, where $f(x) = \sin x - \cos x$, for $x \neq 0$, then $f(0) =$

A. 2

B. 0

C. -1

D. 1

Answer: C



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207. If $f(x)$ is continuous at $x = \frac{\pi}{2}$, where $f(x) = \frac{\sqrt{2} - \sqrt{1 + \sin x}}{\cos^2 x}$, for $x \neq \frac{\pi}{2}$, then $f\left(\frac{\pi}{2}\right) =$

A. $4\sqrt{2}$

B. $2\sqrt{2}$

C. $\frac{1}{4\sqrt{2}}$

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

Answer: C



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208. If $f(x)$ is continuous at $x = \frac{\pi}{4}$, where $f(x) = \frac{1 - \tan x}{1 - \sqrt{2} \sin x}$, for $x \neq \frac{\pi}{4}$, then $f\left(\frac{\pi}{4}\right) =$

A. 2

B. $\sqrt{2}$

C. $2\sqrt{2}$

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

Answer: A



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209. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{\sin(\pi \cos^2 x)}{x^2}$, for $x \neq 0$, then $f(0) =$

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

B. 1

C. $-\pi$

D. π

Answer: D



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210. If $f(x)$ is continuous at $x = \frac{\pi}{4}$ where

$$f(x) = \frac{2\sqrt{2} - (\cos x + \sin x)^3}{1 - \sin 2x}, \text{ for } x \neq \frac{\pi}{4} \text{ then } f\left(\frac{\pi}{4}\right) =$$

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

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

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

D. $3\sqrt{2}$

Answer: A



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211. If $f(\theta)$ is continuous at $\theta = \frac{\pi}{4}$, where

$$f(\theta) = \begin{cases} \frac{1 - \tan \theta}{1 - \sqrt{2} \sin \theta}, & \text{for } \theta \neq \frac{\pi}{4} \\ \frac{k}{2}, & \text{for } \theta = \frac{\pi}{4} \end{cases}, \text{ then } k =$$

A. $2\sqrt{2}$

B. $4\sqrt{2}$

C. 2

D. 4

Answer: D



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212. The function $f(x) = \frac{1 - \sin x + \cos x}{1 + \sin x + \cos x}$ is not defined at $x = \pi$. The value of $f(\pi)$, so that $f(x)$ is continuous at $x = \pi$, is

A. -1

B. 1

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

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

Answer: A



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213. If $f(x)$ is continuous at $x = \frac{\pi}{2}$, where $f(x) = \frac{\cos x}{\sqrt{1 - \sin x}}$, for $x \neq \frac{\pi}{2}$, then $f\left(\frac{\pi}{2}\right) =$

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

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

C. $2\sqrt{2}$

D. $\sqrt{2}$

Answer: D



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214. If $f(x)$ is continuous at $x = \frac{\pi}{4}$, where $f(x) = \frac{\cos x - \sin x}{\cos 2x}$, for $x \neq \frac{\pi}{4}$, then $f\left(\frac{\pi}{4}\right) =$

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

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

C. $\sqrt{2}$

D. $-\sqrt{2}$

Answer: A



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215. If $f(x)$ is continuous at $x = \frac{\pi}{4}$, where $f(x) = \frac{2 - \operatorname{cosec}^2 x}{\cot x - 1}$, for $x \neq \frac{\pi}{4}$, then $f\left(\frac{\pi}{4}\right) =$

A. 4

B. -4

C. 2

D. -2

Answer: D



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216. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{\sin(x^2 - x)}{x}$, for $x \neq 0$, then $f(0) =$

A. -1

B. 1

C. 0

D. 2

Answer: A



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217. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} \frac{x \cos x + 3 \tan x}{x^2 + \sin x}, & \text{for } x \neq 0 \\ k^2, & \text{for } x = 0 \end{cases}, \text{ then } k =$$

A. 2

B. -2

C. ± 2

D. 0

Answer: C



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218. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \frac{\sin(a+x) - \sin(a-x)}{\tan(a+x) - \tan(a-x)}, x \neq 0, \text{ then } f(0) =$$

A. $2 \sec^3 a$

B. $\sec^3 a$

C. $2 \cos^3 a$

D. $\cos^3 a$

Answer: D



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219. $f: R \rightarrow R$ is defined by $f(x) = \begin{cases} \frac{\cos 3x - \cos x}{x^2}, & x \neq 0 \\ \lambda, & x = 0 \end{cases}$

and f is continuous at $x = 0$; then $\lambda =$

A. -4

B. -2

C. -8

D. -6

Answer: A



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220. If $f(x)$ is continuous at $x = 0$, where $f(x) = \begin{cases} \frac{1 - \cos x}{x}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$,

then $k =$

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

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

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

D. 0

Answer: D



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221. If $f(x)$ is continuous at $x = 0$, where $f(x) = \begin{cases} \frac{1 - \cos kx}{x^2}, & \text{for } x \neq 0 \\ \frac{1}{2}, & \text{for } x = 0 \end{cases}$, then $k =$

A. 1

B. -1

C. ± 1

D. 0

Answer: C



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222. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{1 - \cos 3x}{x \tan x}$ for $x \neq 0$, then $f(0) =$

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

B. $\frac{9}{2}$

C. $\frac{3}{4}$

D. $\frac{9}{4}$

Answer: B



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223. Function $f(x) = (1 - \cos 4x) / (8x^2)$, where $x \neq 0$, and $f(x) = k$, where $x = 0$, is a continuous function at $x = 0$ Then : $k =$

A. 16

B. 2

C. -1

D. 1

Answer: D



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224. If $f(x) =$ is continuous at $x = 0$, where $f(x) = \frac{(1 - \cos 2x)(3 + \cos x)}{x \tan 4x}$, for $x \neq 0$, then $f(0) =$

A. 2

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

C. 4

D. 3

Answer: A



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225. If α, β are the roots of $ax^2 + bx + c = 0$ and $f(x)$ is continuous at $x = \alpha$, where $f(x) = \frac{1 - \cos(ax^2 + bx + c)}{(x - \alpha)^2}$, for $x \neq \alpha$, then $f(\alpha) =$

A. 0

B. $\frac{4ac - b^2}{2}$

C. $\frac{b^2 - 4ac}{2}$

D. $\frac{b^2 - 4ac}{2a^2}$

Answer: C



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226. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} \frac{\cos^2 x - \sin^2 x - 1}{\sqrt{x^2 + 1} - 1}, & \text{for } x \neq 0 \\ 2k, & \text{for } x = 0 \end{cases}, \text{ then } k =$$

A. -2

B. -4

C. 2

D. 4

Answer: A



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227. If $f(x)$ is continuous at $x = a$, where

$$f(x) = \frac{\sin(a+x) + \sin(a-x) - 2\sin a}{x \sin x}, \text{ for } x \neq a, \text{ then } f(a) =$$

A. $\frac{1}{a}(1 - \cos a)$

B. $\frac{1}{a}(\cos a - 1)$

C. $\frac{2}{a}(1 - \cos a)$

D. $\frac{2}{a}(\cos a - 1)$

Answer: D



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228. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{3 - 4 \cos x + \cos 2x}{x^2}$,

for $x \neq 0$, then $f(0) =$

A. 0

B. 2

C. -2

D. 4

Answer: A



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229. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{3 - 4 \cos x + \cos 2x}{x^4}$,

for $x \neq 0$, then $f(0) =$

A. $\frac{1}{4}$

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

C. 8

D. 4

Answer: B



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230. The value of k which makes $f(x) = \begin{cases} \sin\left(\frac{1}{x}\right), & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$ continuous at $x = 0$ is

A. 0

B. 1

C. -1

D. no value of k

Answer: D



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231. If the function $f(x)$ defined by

$$f(x) = \begin{cases} x \sin \frac{1}{x}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$$

is continuous at $x = 0$, then k is equal to

A. 0

B. 1

C. -1

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

Answer: A



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232. If $f(x)$ is continuous at $x = a$, where $f(x) = (x - a) \sin\left(\frac{1}{x - a}\right)$, for $x \neq a$, then $f(a) =$

A. 1

B. -1

C. 0

D. ∞

Answer: C



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233. If $(x) = \frac{1 - \sqrt{3} \tan x}{\pi - 6x}$, for $x \neq \frac{\pi}{6}$ is continuous at $x = \frac{\pi}{6}$, find $f\left(\frac{\pi}{6}\right)$.

A. $\frac{1}{3\sqrt{3}}$

B. $\frac{1}{2\sqrt{3}}$

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

D. $\frac{4}{3\sqrt{3}}$

Answer: C



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234. Value of $f\left(\frac{\pi}{4}\right)$ so that the function $f(x) = \frac{\tan\left(\frac{\pi}{4} - x\right)}{\cot 2x}$, $x \neq \frac{\pi}{4}$ is continuous everywhere is

A. 2

B. 1

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

D. $\frac{1}{4}$

Answer: C



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235. Find the value of k, if the functions are continuous at the points given against them :

$$\left. \begin{aligned} f(x) &= \frac{\sqrt{3} - \tan x}{\pi - 3x}, & \text{for } x &\neq \frac{\pi}{3} \\ &= k, & \text{for } x &= \frac{\pi}{3} \end{aligned} \right\} \text{ at } x = \frac{\pi}{3}.$$

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

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

C. $\frac{-4}{3}$

D. $\frac{4}{3}$

Answer: D



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236. If $f(x)$ is continuous at $x = \frac{\pi}{2}$, where $f(x) = \frac{1 - \sin x}{\left(\frac{\pi}{2} - x\right)^2}$, for $x \neq \frac{\pi}{2}$, then $f\left(\frac{\pi}{2}\right) =$

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

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

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

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

Answer: A



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237. If $f(x)$ is continuous at $x = \frac{\pi}{2}$, where $f(x) = \frac{1 - \sin x}{(\pi - 2x)^2}$, for $x \neq \frac{\pi}{2}$, then $f\left(\frac{\pi}{2}\right) =$

A. $\frac{-1}{4}$

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

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

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

Answer: D



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238. If $f(x)$ is continuous at $x = \frac{\pi}{2}$, where

$$f(x) = \begin{cases} \frac{1 - \sin x}{\pi - 2x}, & \text{for } x \neq \frac{\pi}{2} \\ \lambda, & \text{for } x = \frac{\pi}{2} \end{cases}, \text{ then } \lambda =$$

A. -1

B. 1

C. 0

D. 2

Answer: C



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239. For what value of k , function $f(x) = \begin{cases} \frac{k \cos x}{\pi - 2x}, & \text{if } x \neq \frac{\pi}{2} \\ 3, & \text{if } x = \frac{\pi}{2} \end{cases}$ is continuous at $x = \frac{\pi}{2}$?

A. 3

B. -3

C. 6

D. -6

Answer: C



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240. If $f(x)$ is continuous at $x = \frac{\pi}{2}$, where

$$f(x) = \frac{\sec x - \tan x}{\frac{\pi}{2} - x}, \text{ for } x \neq \frac{\pi}{2}, \text{ then } f\left(\frac{\pi}{2}\right) =$$

A. $\frac{1}{4}$

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

C. $\frac{1}{6}$

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

Answer: B



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241. If $f(x)$ is continuous at $x = \pi$, where

$$f(x) = \frac{\sqrt{2 + \cos x} - 1}{(\pi - x)^2}, \text{ for } x \neq \pi, \text{ then } f(\pi) =$$

A. $\frac{1}{4}$

B. $\frac{-1}{4}$

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

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

Answer: A



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242. If $f(x)$ is continuous at $x = \pi$, where $f(x) = \frac{1 - \cos(7(x - \pi))}{5(x - \pi)^2}$,
for $x \neq \pi$, then $f(\pi) =$

A. $\frac{49}{5}$

B. $\frac{49}{10}$

C. $\frac{7}{2}$

D. $\frac{7}{10}$

Answer: B



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243. If $f(x)$ is continuous at $x = 0$, where $f(x) = (1 + 2x)^{\frac{1}{x}}$, for $x \neq 0$, then $f(0) =$

A. e^2

B. e^{-2}

C. $2e$

D. $-2e$

Answer: A



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244. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} (1 + 3x)^{\frac{1}{x}}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}, \text{ then } k =$$

A. e^{-3}

B. e^3

C. $3e$

D. e

Answer: B



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245. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \left(\frac{4 - 3x}{4} \right)^{\frac{8}{x}}, \text{ for } x \neq 0, \text{ then } f(0) =$$

A. e^{-3}

B. e^{-4}

C. e^{-6}

D. e^{-12}

Answer: C



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246. If $f(x) = \begin{cases} \frac{x^2-4}{x-2}, & \text{for } x \neq 2 \\ 5, & \text{for } x = 2 \end{cases}$, then at $x = 2$

- A. f is continuous if $f(0) = -2$
- B. f is continuous
- C. f has removable discontinuity
- D. f has irremovable discontinuity

Answer: C



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247. If $f(x) = \begin{cases} \sqrt[3]{\frac{4x+1}{1-4x}}, & \text{for } x \neq 0 \\ e^6, & \text{for } x = 0 \end{cases}$, then at $x = 0$

- A. f is continuous if $f(0) = e^{-8}$
- B. f is continuous
- C. f has irremovable discontinuity
- D. f has removable discontinuity

Answer: D



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248. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \left(\frac{4 - 3}{4 + 5x} \right)^{\frac{1}{x}}, \text{ for } x \neq 0, \text{ then } f(0) =$$

A. e^2

B. e^{-2}

C. e^{-3}

D. e^5

Answer: B



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249. If $f(x)$ is continuous at $x = 2$, where $f(x) = (x - 1)^{\frac{1}{2-x}}$, for $x \neq 2$, then $f(2) =$

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

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

C. $-e$

D. e

Answer: B



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250. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} (\sec^2 x)^{\cot^2 x}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}, \text{ then } k =$$

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

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

C. e

D. $2e$

Answer: C

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251. If $f(x)$ is continuous at $x = \frac{\pi}{4}$, where $f(x) = (1 + \cos 2x)^{4 \sec 2x}$, for $x \neq \frac{\pi}{4}$, then $f\left(\frac{\pi}{4}\right) =$

A. e^{-4}

B. e^4

C. $4e$

D. e

Answer: B

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252. In order that the function $f(x) = (x + 1)^{\cot x}$ is continuous at $x=0$, the value of $f(0)$ must be defined as :

A. $f(0) = 0$

B. $f(0) = e$

C. $f(0) = \frac{1}{e}$

D. $f(0) = \frac{2}{e}$

Answer: B



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253. $f(x) = \begin{cases} \left(\tan\frac{\pi}{4} + x\right)^{1/x}, & x \neq 0 \\ k, & x = 0 \end{cases}$ for what value of k , $f(x)$ is

continuous at $x = 0$?

A. e

B. e^{-1}

C. e^2

D. e^{-2}

Answer: C



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254. If $f(x)$ is continuous at $x = \frac{\pi}{4}$, where $f(x) = (\sin 2x)^{\tan^2 2x}$, for $x \neq \frac{\pi}{4}$, then $f\left(\frac{\pi}{4}\right) =$

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

B. $\frac{-1}{\sqrt{e}}$

C. \sqrt{e}

D. e^{-2}

Answer: A



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255. If $f(x)$ is continuous at $x = 1$, where $f(x) = (\log_2 2x)^{\log_2 x}$, for $x \neq 1$, then $f(1) =$

A. 0

B. 1

C. e

D. e^2

Answer: C



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256. If $f(x)$ is continuous at $x = 0$, where $f(x) = \begin{cases} \frac{8^x - 2^x}{k^x - 1}, & \text{for } x \neq 0 \\ 2, & \text{for } x = 0 \end{cases}$,

then $k =$

A. 4

B. -2

C. 2

D. ± 2

Answer: C



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257. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{4^x - e^x}{6^x - 1}$, for $x \neq 0$, then $f(0) =$

A. $\frac{\log 4 - 1}{\log 6}$

B. $\frac{1 - \log 4}{\log 6}$

C. $\frac{\log 2 - 2}{\log 6}$

D. $\frac{2 - \log 2}{\log 6}$

Answer: A



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258. The value of f at $x = 0$ so that function $f(x) = \frac{2^x - 2^{-x}}{x}$, $x \neq 0$ is continuous at $x = 0$ is

A. 0

B. e^4

C. $\log 4$

D. $\log 2$

Answer: C



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259. The function $f(x) = \frac{\log(1 + ax) - \log(1 - bx)}{x}$ is not defined at $x = 0$. The value which should be assigned to f at $x = 0$, so that it is continuous at $x = 0$, is

A. $\log a + \log b$

B. $\log a - \log b$

C. $a + b$

D. $a - b$

Answer: C



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260. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \frac{\log 100 + \log(0.01 + x)}{3x}, \text{ for } x \neq 0, \text{ then } f(0) =$$

A. $\frac{10}{3}$

B. $\frac{100}{3}$

C. $\frac{1}{3}$

D. 100

Answer: B



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261. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} \log_{(1-2x)}(1+2x), & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}, \text{ then } k =$$

A. 1

B. -1

C. 2

D. -2

Answer: B



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262. If $f(x) = \begin{cases} \log_{(1-3x)}(1+3x), & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$ is continuous at $x = 0$,

then k is equal to

A. -1

B. 1

C. 3

D. -3

Answer: A



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263. If $f(x)$ is continuous at $x = 7$, where $f(x) = \frac{\log x - \log 7}{x - 7}$, for $x \neq 7$, then $f(7) =$

A. 14

B. 7

C. $\frac{1}{14}$

D. $\frac{1}{7}$

Answer: D



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264. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{e^{5x} - e^{2x}}{\sin 3x}$, for $x \neq 0$ then $f(0) =$

A. 1

B. -1

C. 3

D. $\frac{7}{3}$

Answer: A



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265. Let $f(x) = \frac{(e^{kx} - 1) \cdot \sin Kx}{x^2}$ for $x \neq 0$; $= 4$, for $x = 0$ is continuous at $x = 0$ then k

A. 4

B. -2

C. 2

D. ± 2

Answer: D



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266. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{(e^{2x} - 1)\tan x}{x \sin x}$, for $x \neq 0$, then $f(0) =$

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

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

C. 2

D. -2

Answer: C



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267. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{(e^{3x} - 1)\sin x^\circ}{x^2}$, for $x \neq 0$, then $f(0) =$

A. $\frac{\pi}{180}$

B. $\frac{\pi}{60}$

C. $\frac{\pi}{90}$

D. 3

Answer: B



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268. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{e^{x^2} - \cos x}{x^2}$, for $x \neq 0$, then $f(0) =$

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

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

C. 1

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

Answer: A



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269. If $f(x)$ is continuous at $x = 0$, where $f(x) = \begin{cases} \frac{3^x - 3^{-x}}{\sin x}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$,

then $k =$

A. $\log 9$

B. $\log 3$

C. $\log 1$

D. $\log e$

Answer: A



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270. If $f(x)$ is continuous at $x = 0$, where $f(x) = \begin{cases} \frac{9^x - 9^{-x}}{\sin x}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$,

then $k =$

A. $\log 9$

B. $\log 81$

C. $2 \log 3$

D. $(\log 9)^2$

Answer: B



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271. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{10^x + 7^x - 14^x - 5^x}{1 - \cos 4x}$,

for $x \neq 0$, then $f(0) =$

A. $\frac{1}{4}(\log 2)\log\left(\frac{5}{7}\right)$

B. $\frac{1}{8}(\log 2)\log\left(\frac{5}{7}\right)$

C. $\frac{1}{4}(\log 2)\log\left(\frac{7}{5}\right)$

D. $\frac{1}{8}(\log 2)\log\left(\frac{7}{5}\right)$

Answer: B



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272. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{(5^x - 2^x)x}{\cos 5x - \cos 3x}$, for $x \neq 0$, then $f(0) =$

A. $\frac{-1}{4} \log\left(\frac{2}{5}\right)$

B. $\frac{1}{4} \log\left(\frac{2}{5}\right)$

C. $\frac{-1}{8} \log\left(\frac{2}{5}\right)$

D. $\frac{1}{8} \log\left(\frac{2}{5}\right)$

Answer: D



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273. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{4^x - 2^{x+1} + 1}{1 - \cos x}$, for $x \neq 0$, then $f(0) =$

A. $(2 \log 2)^2$

B. $2(\log 2)^2$

C. $(\log 2)^2$

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

Answer: B



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274. If $f(x)$ is continuous at $x = \frac{\pi}{2}$, where $f(x) = \frac{3^{x - \frac{\pi}{2}} - 6^{x - \frac{\pi}{2}}}{\cos x}$, for $x \neq \frac{\pi}{2}$, then $f\left(\frac{\pi}{2}\right) =$

A. $\log 3$

B. $\log 6$

C. $\log 2$

D. $\log 18$

Answer: C



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275. If $f(x)$ is continuous at $x = a$, $a > 0$, where $f(x) = \begin{cases} \frac{a^x - x^a}{x^x - a^a}, & \text{for } x \neq a \\ -1, & \text{for } x = a \end{cases}$, then $a =$

A. e

B. $2e$

C. 1

D. 0

Answer: C



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276. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} \frac{\log(1+kx)}{\sin x}, & \text{for } x \neq 0 \\ 5, & \text{for } x = 0 \end{cases}, \text{ then } k =$$

A. 5

B. -5

C. $\frac{1}{5}$

D. $\frac{-1}{5}$

Answer: A



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277. For what value of k , the function defined by

$$f(x) = \begin{cases} \frac{\log(1+2x) \sin x^\circ}{x^2}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$$

is continuous at $x = 0$?

A. 2

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

C. $\frac{\pi}{90}$

D. $\frac{90}{\pi}$

Answer: C



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278. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{\log \sec^2 x}{x \sin x}$, for $x \neq 0$ then $f(0) =$

A. e

B. ± 1

C. -1

D. 1

Answer: D



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279. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \frac{\log(1+x^2) - \log(1-x^2)}{\sec x - \cos x}, \text{ for } x \neq 0, \text{ then } f(0) =$$

A. 0

B. 2

C. 1

D. -1

Answer: B



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280. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \frac{\log(1 + x + x^2) + \log(1 - x + x^2)}{\sin x}, \text{ for } x \neq 0, \text{ then } f(0) =$$

A. 0

B. 2

C. 1

D. -1

Answer: A



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281. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \frac{\log(2+x) - \log(2-x)}{\tan x}, \text{ for } x \neq 0, \text{ then } f(0) =$$

A. $\frac{1}{4}$

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

C. 2

D. 1

Answer: D



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282. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{(e^{3x} - 1)\sin x}{x \log(1+x)}$, for $x \neq 0$,

find $f(0)$.

A. 1

B. 3

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

D. $\frac{1}{3}$

Answer: B



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283. If $f(x) = \frac{(8^x - 1)^2}{\sin x \log\left(1 + \frac{x}{4}\right)}$ in $[-1, 1] - \{0\}$, then for removable discontinuity of f at $x = 0$, $f(0) =$

A. $4 \log 8$

B. $8 \log 2$

C. $4(\log 8)^2$

D. $8(\log 2)^2$

Answer: C



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284. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{(4^{\sin x} - 1)^2}{x \log(1 + 2x)}$, for $x \neq 0$, then $f(0) =$

A. $\frac{1}{4}(\log 4)^2$

B. $\frac{1}{2}(\log 4)^2$

C. $2(\log 4)^2$

D. $2(\log 2)^2$

Answer: D



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285. If $f(x)$ is continuous at $x = 0$, where $f(x) = \frac{(3^{\sin x} - 1)^2}{x \log(1 - x)}$, for $x \neq 0$, then $f(0) =$

A. $(\log 3)^2$

B. $\log 9$

C. $\frac{1}{2} \log 3$

D. $\log 3$

Answer: A



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286. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} \frac{(e^x - 1)^4}{\sin\left(\frac{x^2}{k^2}\right) \log\left(1 + \frac{x^2}{2}\right)}, & \text{for } x \neq 0 \\ 8, & \text{for } x = 0 \end{cases}, \text{ then } k =$$

A. 1

B. ± 2

C. 2

D. -2

Answer: B



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287. If $f(x) = \frac{e^x + e^{-x} - 2}{x \sin x}$, for $x \in \left[-\frac{\pi}{2}, \frac{\pi}{2} \right] - \{0\}$, then for f to be continuous in $\left[-\frac{\pi}{2}, \frac{\pi}{2} \right]$, $f(0) =$

A. $-e^2$

B. e^2

C. -1

D. 1

Answer: D



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288. The function defined by $f(x) = \begin{cases} (1 + \tan^2 \sqrt{x})^{\frac{1}{2x}}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$, is

continuous from right at point $x = 0$, then $k =$

A. e

B. e^2

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

D. $e^{\frac{1}{4}}$

Answer: C



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289. The function defined by

$$f(x) = \begin{cases} \left(x^2 + e^{\frac{1}{2-x}}\right)^{-1}, & x \neq 2 \\ k, & x = 2 \end{cases}$$

is continuous from right at the point

$x=2$, then k is equal to

A. 0

B. 4

C. $-\frac{1}{4}$

D. $\frac{1}{4}$

Answer: D



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290. If $f(x) = x^2 - \sin x + 5$, then at $x = \pi$

A. f is discontinuous

B. f is continuous

C. $\lim_{x \rightarrow \pi^-} f(x) = \pi^2 - 5$

D. $\lim_{x \rightarrow \pi^+} f(x) = 5 - \pi^2$

Answer: B



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

A. $\lim_{x \rightarrow \frac{1}{2}^-} f(x) = \frac{-1}{2}$

B. $\lim_{x \rightarrow \frac{1}{2}^+} f(x) = \frac{-1}{2}$

C. f is continuous at $x = \frac{1}{2}$

D. f is discontinuous at $x = \frac{1}{2}$

Answer: C



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292. If $f(x) = \begin{cases} \frac{x^2-9}{x-3}, & \text{for } 0 < x < 3 \\ x+3, & \text{for } 3 \leq x < 6 \\ \frac{x^2-9}{x+3}, & \text{for } 6 \leq x < 9 \end{cases}$, then f is

A. continuous at $x = 3, x = 6$

B. discontinuous at $x = 3, x = 6$

C. continuous at $x = 6$ and discontinuous at $x = 3$

D. continuous at $x = 3$ and discontinuous at $x = 6$

Answer: D



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293. If $f(x) = \begin{cases} \frac{\sin 2x}{\sqrt{1 - \cos 2x}}, & \text{for } 0 < x < \frac{\pi}{2} \\ \frac{\cos x}{\pi - 2x}, & \text{for } \frac{\pi}{2} < x < \pi \end{cases}$, then

A. f is discontinuous at $x = \frac{\pi}{2}$

B. f is continuous at $x = \frac{\pi}{2}$

C. $\lim_{x \rightarrow \frac{\pi}{2}^-} f(x) = \frac{1}{2}$

D. $\lim_{x \rightarrow \frac{\pi}{2}^+} f(x) = 0$

Answer: A



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

A. $\lim_{x \rightarrow 2^-} f(x) = 7$

B. $\lim_{x \rightarrow 2^+} f(x) = 1$

C. f has removable discontinuity at $x = 2$

D. f has irremovable discontinuity at $x = 2$

Answer: D



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295. If $f(x) = \begin{cases} x \sin x, & \text{for } 0 < x \leq \frac{\pi}{2} \\ \frac{\pi}{2} \sin(\pi + x), & \text{for } \frac{\pi}{2} < x < \pi \end{cases}$, then

A. $f(x)$ is discontinuous at $x = \frac{\pi}{2}$

B. $f(x)$ is continuous at $x = \frac{\pi}{2}$

C. $f(x)$ is continuous at $x = 0$

D. $f(x)$ is discontinuous at $x = 0$

Answer: A



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296. If $f(x)$ is continuous at $x = 0$, where

$f(x) = \begin{cases} \frac{\sin x}{x} + \cos x, & \text{for } x > 0 \\ \frac{4(1 - \sqrt{1-x})}{x}, & \text{for } x < 0 \end{cases}$, then $f(0) =$

A. 2

B. -2

C. 4

D. -4

Answer: A



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297. If $f(x) = \begin{cases} x + 2, & \text{if } x \leq 4 \\ x + 4, & \text{if } x > 4 \end{cases}$, then

A. $\lim_{x \rightarrow 4^+} f(x) = 6$

B. $\lim_{x \rightarrow 4^-} f(x) = 8$

C. f has removable discontinuity

D. f has irremovable discontinuity

Answer: D



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298. If $f(x) = \begin{cases} 2x, & \text{if } x < 2 \\ 2, & \text{if } x = 2 \\ x^2, & \text{if } x > 2 \end{cases}$, then

A. $\lim_{x \rightarrow 2^-} f(x) = -4$

B. $\lim_{x \rightarrow 2^+} f(x) = -4$

C. f has irremovable discontinuity

D. f has removable discontinuity

Answer: D



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299. If $f(x) = \begin{cases} x - 1, & \text{for } 1 \leq x < 2 \\ 2, & \text{for } x = 2 \\ 2x - 3, & \text{for } 2 < x < 3 \end{cases}$, then f has removable

discontinuity at $x = 2$, if $f(2) =$

A. 2

B. 3

C. 1

D. -1

Answer: C



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300. If $f(x) = \begin{cases} x^2, & \text{for } x \leq 1 \\ x + 3, & \text{for } x > 1 \end{cases}$, then at $x = 1$

A. $\lim_{x \rightarrow 1^-} f(x) = 4$

B. $\lim_{x \rightarrow 1^+} f(x) = 1$

C. f has removable discontinuity

D. f has irremovable discontinuity

Answer: D



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301. If $f(x) = \sqrt{x - 2}$, for $2 < x < 4$, then $f(x)$ is

- A. continuous in $(2, 4)$ except at $x = 3$
- B. discontinuous in $(2, 4)$ except at $x = 3$
- C. discontinuous in $(2, 4)$
- D. continuous in $(2, 4)$

Answer: D



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302. If $f(x) = \begin{cases} 1 - x, & \text{for } 0 < x \leq 1 \\ \frac{1}{2}, & \text{for } x = 0 \end{cases}$, then in $[0, 1]$

- A. $f(x)$ is not continuous
- B. $f(x)$ is continuous
- C. $f(x)$ is continuous at $x = 0$
- D. $f(x)$ is continuous at $x = 1$

Answer: A



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303. If $f(x) = \begin{cases} 3x + 5, & \text{for } 0 \leq x < 3 \\ 2x + 8, & \text{for } 3 \leq x < 5 \\ x + 13, & \text{for } 5 \leq x \leq 10 \end{cases}$, then

- A. $f(x)$ is discontinuous in its domain
- B. $f(x)$ is continuous in its domain
- C. $f(x)$ is continuous in its domain except at $x = 3$
- D. $f(x)$ is continuous in its domain except at $x = 5$

Answer: B



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304. If $f(x) = \begin{cases} \frac{\sin x}{x}, & \text{for } x < 0 \\ x + 1, & \text{for } x \geq 0 \end{cases}$, then

- A. f is continuous on its domain
- B. f is discontinuous on its domain
- C. f is continuous on its domain except $x = 0$
- D. f is discontinuous on its domain except $x = 0$

Answer: A



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305. If $f(x) = \begin{cases} \frac{2x+5}{x+1}, & \text{for } 0 \leq x < 2 \\ 4x - 5, & \text{for } 2 \leq x \leq 4 \\ \frac{x^2+2}{x-5}, & \text{for } 4 < x \leq 6, x \neq 5 \end{cases}$ then

- A. f is continuous on its domain
- B. f is continuous on its domain except $x = 5$
- C. f is continuous on its domain except $x = 4$
- D. f is continuous on its domain except $x = 2$

Answer: C

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306. If $f(x) = \begin{cases} \frac{\sin 2x}{\sqrt{1 - \cos 2x}}, & \text{for } 0 < x \leq \frac{\pi}{2} \\ \frac{\cos x}{\pi - 2x}, & \text{for } \frac{\pi}{2} < x \leq \pi \end{cases}$

- A. f is continuous on its domain except $x = \frac{\pi}{2}$
- B. f is continuous on its domain
- C. f is discontinuous on its domain
- D. f is continuous on its domain except $x = 0$

Answer: A

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307. If $f(x) = \begin{cases} x, & \text{for } 0 \leq x < 1 \\ 2, & \text{for } x = 1 \\ x + 1, & \text{for } 1 < x \leq 2 \end{cases}$, then f is

- A. f is continuous at $x = 1$
- B. f is discontinuous at $x = 1$

C. $\lim_{x \rightarrow 1^-} f(x) = 2$

D. $\lim_{x \rightarrow 1^+} f(x) = 1$

Answer: B



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308. If $f(x) = \frac{x^3 + 3x + 5}{x^3 - 3x + 2}$ in $[0, 5]$, then f is

A. continuous on its domain except at $x = 1, x = -2$

B. continuous on its domain except at $x = 1$

C. continuous on its domain except at $x = -2$

D. continuous on its domain

Answer: B



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309. If $f(x) = \frac{x+1}{(x-2)(x-5)}$, then in $[4, 6]$

- A. f is discontinuous
- B. f is continuous
- C. f is continuous except at $x = 2$
- D. f is continuous except at $x = 5$

Answer: D



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310. If $f(x) = \frac{x+1}{(x-2)(x-5)}$, then in $[0, 1]$

- A. f is continuous
- B. f is discontinuous
- C. f is continuous except at $x = 0$
- D. f is continuous except at $x = 1$

Answer: A



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311. If $f(x) = \begin{cases} x, & \text{for } x \geq 0 \\ x^2, & \text{for } x < 0 \end{cases}$, then f is

- A. continuous on \mathbb{R} except at $x = 0$
- B. continuous on \mathbb{R}
- C. discontinuous on \mathbb{R} except at $x = 0$
- D. continuous on \mathbb{R}^+ only

Answer: B



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312. If $f(x) = \begin{cases} x^2 - 4, & \text{for } 0 \leq x \leq 2 \\ 2x + 3, & \text{for } 2 < x \leq 4 \\ x^2 - 5, & \text{for } 4 < x \leq 6 \end{cases}$, then

A. f is continuous on $[0, 6]$

B. f is discontinuous on $[0, 6]$

C. f is continuous on $[0, 6]$ except at $x = 2$

D. f is continuous on $[0, 6]$ except at $x = 4$

Answer: C



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313. If $f(x) = \begin{cases} \frac{1}{x+1}, & \text{for } 2 \leq x \leq 4 \\ \frac{x+1}{x-3}, & \text{for } 4 < x \leq 6 \end{cases}$, then

A. f is discontinuous on $[2, 6]$

B. f is continuous on $[2, 6]$

C. f is continuous on $[2, 6]$ except at $x = 3$

D. f is continuous on $[2, 6]$ except at $x = 4$

Answer: D



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314. If $f(x) = \begin{cases} 3, & \text{if } 0 \leq x \leq 1 \\ 4, & \text{if } 1 < x < 3 \\ 5, & \text{if } 3 \leq x \leq 10 \end{cases}$, then

- A. f is continuous on $[0, 10]$ except at $x = 1, 3$
- B. f is continuous on $[0, 10]$ except at $x = 1$
- C. f is continuous on $[0, 10]$ except at $x = 3$
- D. f is continuous on $[0, 10]$

Answer: A



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

- A. f is discontinuous on its domain
- B. f is continuous on its domain

C. f is continuous on its domain except at $x = -1$

D. f is continuous on its domain except at $x = 1$

Answer: B



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$$316. f(x) = \begin{cases} |x| + 3 & \text{if } x \leq -3 \\ -2x & \text{if } -3 < x < 3 \\ 6x + 2 & \text{if } x \geq 3 \end{cases}$$

A. f is continuous on its domain except at $x = -3$

B. f is continuous on its domain except at $x = 3$

C. f is continuous on its domain except at $x = -3, 3$

D. f is continuous on its domain

Answer: C



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317. If $f(x) = \begin{cases} 2x, & \text{for } x < 0 \\ 2x + 1, & \text{for } x \geq 0 \end{cases}$, then

- A. $f(|x|)$ is continuous at $x = 0$
- B. $f(x)$ is discontinuous at $x = 0$
- C. $f(x)$ is continuous at $x = 0$
- D. $f(|x|)$ is discontinuous at $x = 0$

Answer: B



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318. Function $f(x) = \begin{cases} x - 1, & x < 2 \\ 2x - 3, & x \geq 2 \end{cases}$ is a continuous function

- A. for $x = 2$ only
- B. for all real values of x
- C. for all real values of x such that $x \neq 2$
- D. for all integral values of x only

Answer: B



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319. If $f(x) = \frac{x^3 - 8}{x^2 + x - 20}$, then

- A. f is continuous on \mathbb{R}
- B. f is continuous on $\mathbb{R} - (-5, 4)$
- C. f is continuous on $\mathbb{R} - \{-5, 4\}$
- D. f is continuous on $\mathbb{R} - [-5, 4]$

Answer: C



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320. If $f(x) = \begin{cases} \frac{x^2 - 3x + 2}{x - 3}, & \text{for } 0 \leq x < 4 \\ \frac{x^2 - 1}{x - 2}, & \text{for } 4 \leq x \leq 6 \end{cases}$, then on $[0, 6]$

- A. f is continuous except at $x = 2$

B. f is continuous except at $x = 3$

C. f is continuous except at $x = 4$

D. f is continuous except at $x = 3$ and $x = 4$

Answer: D



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321. If $f(x)$ is continuous at $x = 1$, where $f(x) = \begin{cases} k + x, & \text{for } x < 1 \\ 4x + 3, & \text{for } x \geq 1 \end{cases}$,
then $k =$

A. 7

B. 8

C. 6

D. -6

Answer: C



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322. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} x^2 + 1, & \text{for } x \geq 0 \\ 2\sqrt{x^2 + 1} + k, & \text{for } x < 0 \end{cases}, \text{ then } k =$$

A. 3

B. -2

C. -1

D. 1

Answer: C



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323. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} k(x^2 - 2), & \text{for } x \leq 0 \\ 4x + 1, & \text{for } x > 0 \end{cases}, \text{ then } k =$$

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

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

C. 2

D. -2

Answer: B



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324. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} x^2 + \alpha, & \text{for } x \geq 0 \\ 2\sqrt{x^2 + 1} + \beta, & \text{for } x < 0 \end{cases} \text{ and } f\left(\frac{1}{2}\right) = 2, \text{ then}$$

A. $\alpha = \frac{-1}{4}, \beta = \frac{7}{4}$

B. $\alpha = \frac{-7}{4}, \beta = \frac{1}{4}$

C. $\alpha = \frac{1}{4}, \beta = \frac{-7}{4}$

D. $\alpha = \frac{7}{4}, \beta = \frac{-1}{4}$

Answer: D



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325. If $f(x)$ is continuous at $x = 3$, where

$$f(x) = \begin{cases} \frac{x^2-9}{x-3} + \alpha, & \text{for } x > 3 \\ 5, & \text{for } x = 3 \\ 2x^2 + 3x + \beta, & \text{for } x < 3 \end{cases}, \text{ then}$$

A. $\alpha = -1, \beta = 22$

B. $\alpha = 1, \beta = -22$

C. $\alpha = -1, \beta = -22$

D. $\alpha = 1, \beta = 22$

Answer: C



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326. If $f(x)$ is continuous at $x = 2$ and $x = 10$, where

$$f(x) = \begin{cases} 5, & \text{if } x \leq 2 \\ ax + b, & \text{if } 2 < x < 10 \\ 21, & \text{if } x \geq 10 \end{cases}, \text{ then}$$

A. $a = 2, b = 1$

B. $a = -2, b = -1$

C. $a = 2, b = -1$

D. $a = -2, b = 1$

Answer: A



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327. If $f(x)$ is continuous at $x = 1$, where $f(x) = \begin{cases} kx^2, & \text{for } x \geq 1 \\ 4, & \text{for } x < 1 \end{cases}$,
then $k =$

A. 2

B. 4

C. -2

D. ± 2

Answer: B



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328. If $f(x)$ is continuous on $[0, 8]$, where

$$f(x) = \begin{cases} x^2 + ax + 6, & \text{for } 0 \leq x < 2 \\ 3x + 2, & \text{for } 2 \leq x \leq 4 \\ 2ax + 5b, & \text{for } 4 < x \leq 8 \end{cases}, \text{ then}$$

A. $a = -1, b = \frac{22}{5}$

B. $a = -1, b = \frac{-8}{5}$

C. $a = -1, b = \frac{-22}{5}$

D. $a = 1, b = \frac{8}{5}$

Answer: A



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329. If $f(x)$ is continuous in $[0, 3]$, where

$$f(x) = \begin{cases} 3x - 4, & \text{for } 0 \leq x \leq 2 \\ 2x + k, & \text{for } 2 < x \leq 3 \end{cases}, \text{ then } k =$$

A. 6

B. -14

C. 2

D. -2

Answer: D



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330. If $f(x)$ continuous on its domain, where

$$f(x) = \begin{cases} 6, & \text{for } x \leq 2 \\ ax + b, & \text{for } 2 < x < 10, \text{ then} \\ 22, & \text{for } x \geq 10 \end{cases}$$

A. $a = 3, b = 1$

B. $a = 2, b = -1$

C. $a = 3, b = -1$

D. $a = 2, b = 2$

Answer: D



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331. If $f(x)$ is continuous on $[-4, 2]$, defined as

$$f(x) = 6b - 3ax, \text{ for } -4 \leq x < -2$$

$$= 4x + 1, \text{ for } -2 \leq x \leq 2,$$

find the value of $a + b$.

A. $\frac{7}{6}$

B. $\frac{-7}{6}$

C. $\frac{9}{2}$

D. $\frac{-9}{2}$

Answer: B



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332. If $f(x)$ is continuous at $x = 3$, where $f(x) = \begin{cases} ax + 1, & \text{for } x \leq 3 \\ bx + 3, & \text{for } x > 3 \end{cases}$,

then

A. $a + b = \frac{2}{3}$

B. $a + b = \frac{-2}{3}$

C. $a - b = \frac{2}{3}$

D. $a - b = \frac{-2}{3}$

Answer: C



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333. If $f(x)$ is continuous in $[-2, 2]$, where $f(x) = \begin{cases} x + a, & \text{for } x < 0 \\ x, & \text{for } 0 \leq x < 1 \\ b - x, & \text{for } x \geq 1 \end{cases}$,

then $a + b =$

A. 0

B. -2

C. ± 2

D. 2

Answer: D



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334. If $f(x) = \begin{cases} \frac{\sqrt{1+kx} - \sqrt{1-kx}}{x} & , \text{ for } -1 \leq x < 0 \\ 2x^2 + 3x - 2 & , \text{ for } 0 \leq x \leq 1 \end{cases}$

A. -1

B. -2

C. -3

D. -4

Answer: B



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335. If the function $f: R \rightarrow R$ given by

$f(x) = \begin{cases} x + a, & \text{if } x \leq 1 \\ 3 - x^2, & \text{if } x > 1 \end{cases}$ is continuous at $x = 1$, then a is equal to

A. 2

B. 1

C. 4

D. 3

Answer: B



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336. If $f(x) = \begin{cases} ax^2 - b, & \text{for } 0 \leq x < 1 \\ 2, & \text{for } x = 1 \\ x + 1, & \text{for } 1 < x \leq 2 \end{cases}$ is continuous at $x = 1$, then

the most suitable values of a, b are

A. $a = 2, b = -2$

B. $a = -1, b = -1$

C. $a = 1, b = 1$

D. $a = 1, b = -1$

Answer: D



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337. If the function and the derivative of the function $f(x)$ is everywhere continuous and is given by

$$f(x) = \begin{cases} bx^2 + ax + 4, & \text{for } x \geq -1 \\ ax^2 + b, & \text{for } x < -1 \end{cases}, \text{ then}$$

A. $a = 3, b = 2$

B. $a = 2, b = 3$

C. $a = -2, b = -3$

D. $a = -3, b = -2$

Answer: B



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338. If $f(x)$ is continuous at $x = 2$, where $f(x) = \begin{cases} 4x - 3, & \text{for } x < 2 \\ kx + 7, & \text{for } x > 2 \end{cases}$, then $k =$

A. -1

B. 1

C. -6

D. 6

Answer: A



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339. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} \frac{1 - \cos 4x}{x^2}, & \text{for } x < 0 \\ k, & \text{for } x = 0 \\ \frac{\sqrt{x}}{\sqrt{16 + \sqrt{x}} - 4}, & \text{for } x > 0 \end{cases}, \text{ then } k =$$

A. 2

B. 0

C. 4

D. 8

Answer: D



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340. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} \frac{\sin 4x}{5x} + a, & \text{for } x > 0 \\ x + 4 - b, & \text{for } x < 0, \\ 1, & \text{for } x = 0 \end{cases} \text{ then}$$

A. $a = \frac{1}{5}, b = 3$

B. $a = \frac{-1}{5}, b = -3$

C. $a = \frac{1}{5}, b = -3$

D. $a = \frac{-1}{5}, b = 3$

Answer: A



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341. If $f(x) = \frac{\sin \pi x}{x - 1} + a$, for $x < 1$

$= 2\pi$, for $x = 1$

$= \frac{1 + \cos \pi x}{\pi} (1 - x)^2 + b$, for $x > 1$

is continuous at $x = 1$, find a and b

A. $a = \pi, b = \frac{3\pi}{2}$

B. $a = 3\pi, b = \frac{3\pi}{2}$

C. $a = \pi, b = \frac{5\pi}{2}$

D. $a = 3\pi, b = \frac{5\pi}{2}$

Answer: B



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342. If $f(x)$ and $f'(x)$ are continuous at $x = \frac{\pi}{6}$, where

$$f(x) = \begin{cases} \sin 2x, & \text{if } x < \frac{\pi}{6} \\ ax + b, & \text{if } x > \frac{\pi}{6} \end{cases}, \text{ then}$$

A. $a = -2, b = \frac{\sqrt{3}}{2} + \frac{\pi}{3}$

B. $a = 2, b = \frac{\sqrt{3}}{2} - \frac{\pi}{3}$

C. $a = -1, b = \frac{\sqrt{3}}{2} + \frac{\pi}{6}$

D. $a = 1, b = \frac{\sqrt{3}}{2} - \frac{\pi}{6}$

Answer: D

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343. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} \frac{\sin(a+1)x + \sin x}{x}, & \text{for } x < 0 \\ c, & \text{for } x = 0 \\ \frac{\sqrt{x+bx^2} - \sqrt{x}}{b\sqrt{x}}, & \text{for } x > 0 \end{cases}, \text{ then}$$

A. $a = -2, b = 0, c = 0$

B. $a = -2, b = R, c = 0$

C. $a = -2, b \neq 0, c = 0$

D. $a = -2, b = 0, c \neq 0$

Answer: C

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344. If $f(x)$ is continuous at $x = 0$, where

$$f(x) = \begin{cases} \frac{\sin(a+1)x + \sin x}{x}, & \text{for } x < 0 \\ c, & \text{for } x = 0 \\ \frac{\sqrt{x+bx^2} - \sqrt{x}}{b\sqrt{x}}, & \text{for } x > 0 \end{cases}, \text{ then}$$

A. $a = -2, b = R, c = 0$

B. $a = -2, b \neq 0, c = 0$

C. $a = \frac{-3}{2}, b = R, c = \frac{1}{2}$

D. $a = \frac{-3}{2}, b = R - \{0\}, c = \frac{1}{2}$

Answer: D



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345. If $f(x)$ is continuous on $[-2, 2]$, where

$$f(x) = \begin{cases} \frac{\sin ax}{x} + 2, & \text{for } -2 \leq x < 0 \\ 3x + 5, & \text{for } 0 \leq x \leq 1 \\ \sqrt{x^2 + 8} - b, & \text{for } 1 < x < 2 \end{cases}, \text{ then } a + b =$$

A. -15

B. 0

C. 2

D. -2

Answer: D



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346. The values of a and b so that the function

$$f(x) = \begin{cases} x + a\sqrt{2}\sin x, & 0 \leq x < \pi/4 \\ 2x \cot x + b, & \pi/4 \leq x \leq \pi/2 \\ a \cos 2x - b \sin x, & \pi/2 < x \leq \pi \end{cases} \text{ is continuous for}$$

$x \in [0, \pi]$, are

A. $a = \frac{-\pi}{6}, b = \frac{\pi}{12}$

B. $a = \frac{\pi}{6}, b = \frac{-\pi}{12}$

C. $a = \frac{-\pi}{6}, b = \frac{-\pi}{12}$

D. $a = \frac{\pi}{6}, b = \frac{\pi}{12}$

Answer: B



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347. If $f(x)$ is continuous over $[-\pi, \pi]$, where $f(x)$ is defined as

$$f(x) = \begin{cases} -2 \sin x & , \quad -\pi \leq x \leq \frac{-\pi}{2} \\ \alpha \sin x + \beta & , \quad -\frac{\pi}{2} < x < \frac{\pi}{2} \\ \cos x & , \quad \frac{\pi}{2} \leq x < \pi \end{cases}$$

then α and β equals

A. $\alpha = 1, \beta = 1$

B. $\alpha = -1, \beta = -1$

C. $\alpha = -1, \beta = 1$

D. $\alpha = 1, \beta = -1$

Answer: C



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348. If $f(x)$ is continuous in $[-2, 2]$, where

$$f(x) = \begin{cases} \frac{\sin ax}{x} - 1, & \text{for } -2 \leq x < 0 \\ 2x + 1, & \text{for } 0 \leq x \leq 1 \\ 2b\sqrt{x^2 + 3} - 1, & \text{for } 1 < x \leq 2 \end{cases}, \text{ then } a + b =$$

A. 3

B. 1

C. 4

D. 2

Answer: C



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349. If $f(x)$ is continuous in $(-\infty, 6)$, where

$$f(x) = \begin{cases} 1 + \sin\left(\frac{\pi x}{2}\right), & \text{for } -\infty < x \leq 1 \\ ax + b, & \text{for } 1 < x < 3 \\ 6 \tan\left(\frac{\pi x}{12}\right), & \text{for } 3 \leq x < 6 \end{cases}, \text{ then}$$

A. $a = 2, b = 0$

B. $a = 0, b = 2$

C. $a = 1, b = 1$

D. $a = 2, b = 1$

Answer: A



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350. If $f(x) = \begin{cases} ax + 1, & x \leq \frac{\pi}{2} \\ \sin x + b, & x > \frac{\pi}{2} \end{cases}$ is continuous, then

A. $\frac{a\pi}{2} = b$

B. $\frac{b\pi}{2} = a_a$

C. $a = b = \frac{\pi}{2}$

D. $a = b = \frac{\pi}{2} + 1$

Answer: A



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351. If $f(x) = \begin{cases} \frac{e^{\frac{1}{x}} - 1}{e^{\frac{1}{x}} + 1}, & \text{for } x \neq 0 \\ 1, & \text{for } x = 0 \end{cases}$, then f is

- A. continuous at $x = 0$
- B. discontinuous at $x = 0$
- C. continuous if $f(0) = -1$
- D. discontinuous if $f(0) = -1$

Answer: B



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352. If $f(x)$ is continuous at $x = 0$, where $f(x) = \begin{cases} \frac{1}{1 + e^{\frac{1}{x}}}, & \text{for } x \neq 0 \\ k, & \text{for } x = 0 \end{cases}$, then $k =$

- A. 1
- B. 0
- C. -1

D. does not exists

Answer: D



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353. The function $f(x) = k (k \in R)$ at every $x \in R$ is

A. continuous on R^+

B. continuous on R

C. discontinuous on R^+

D. discontinuous on R

Answer: B



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354. The composition of two continuous functions is a continuous function.

- A. discontinuous
- B. continuous
- C. continuous for some real numbers
- D. discontinuous for some real numbers

Answer: B



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355. If $f(x) = \sin x$, then f is

- A. discontinuous for all $x \in R$
- B. continuous for all $x \in R^+$
- C. continuous for all $x \in R^-$
- D. continuous for all $x \in R$

Answer: D



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356. If $f(x) = \sin x^2$, then f is

- A. continuous for all $x \in \mathbb{R}$
- B. discontinuous for all $x \in \mathbb{R}$
- C. continuous for only $x \in \mathbb{R}^+$
- D. continuous for only $x \in \mathbb{R}^-$

Answer: A



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357. If $f(x) = a^x$, $a > 0$, then f is

- A. continuous for all $x \in \mathbb{R}^+$

B. continuous for all $x \in \mathbb{R}^-$

C. continuous for all $x \in \mathbb{R}$

D. discontinuous for all $x \in \mathbb{R}$

Answer: C



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358. The function $f(x) = \log_c x$, where $c > 0, x > 0$ is

A. continuous in $(-\infty, \infty)$

B. continuous in $(0, \infty)$

C. discontinuous in $(-\infty, \infty)$

D. discontinuous in $(0, \infty)$

Answer: B



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359. The rational function $f(x) = \frac{g(x)}{h(x)}$, $h(x) \neq 0$ is

- A. continuous
- B. discontinuous for integer values only
- C. continuous for integer values only
- D. continuous for imaginary values only

Answer: A



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360. The function $f(x) = |x|$ is

- A. continuous on \mathbb{R}
- B. discontinuous on \mathbb{R}
- C. continuous on only \mathbb{R}^+
- D. discontinuous only \mathbb{R}^+

Answer: A



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361. The function $f(x) = |\cos x|$ is

- A. continuous on \mathbb{R}
- B. discontinuous on \mathbb{R}
- C. continuous on only \mathbb{R}^+
- D. discontinuous only \mathbb{R}^+

Answer: A



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362. If $f(x) = |x|$, then at $x = 0$

- A. discontinuous

B. continuous

C. $\lim_{x \rightarrow 0} f(x) = 1$

D. $\lim_{x \rightarrow 0} f(x) = -1$

Answer: B



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363. If $f(x)$ is continuous at $x = 3$, where $f(x) = \begin{cases} |x - 3|, & \text{for } x \neq 3 \\ k, & \text{for } x = 3 \end{cases}$,

then $k =$

A. 1

B. 0

C. -1

D. does not exist

Answer: B



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364. If $f(x) = [x]$, where x is the greatest integer not greater than x , in $(-4, 4)$, then $f(x)$ is

- A. discontinuous at $x = 0$, only in $(-4, 4)$
- B. continuous at $x = 0$ only in $(-4, 4)$
- C. discontinuous at every integral point of $(-4, 4)$
- D. continuous at every integral point of $(-4, 4)$

Answer: C



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365. If $f(x) = |(1+x)|x|$, then f is

- A. discontinuous for all $x \in R$
- B. continuous for all $x \in R$
- C. continuous for all $x \in R^+$

D. continuous for all $x \in \mathbb{R}^+$

Answer: B



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366. If $f(x) = |x| + |x - 1|$, then in $[-1, 2]$

A. f is continuous except at $x = 0$

B. f is continuous except at $x = 1$

C. f is continuous

D. f is discontinuous

Answer: C



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367. The function $f(x) = x + |x|$ is continuous for

A. only $x > 0$

B. $x \in (-\infty, \infty) - \{0\}$

C. $x \in (-\infty, \infty)$

D. no values of x

Answer: C



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368. The function $f(x) = |x| \forall x \in R$ is

A. continuous for all $x \in R^-$

B. continuous for all $x \in R^+$

C. continuous for all $x \in R$

D. discontinuous for all $x \in R$

Answer: C



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369. If $f(x) = 2x - |x|$, then at $x = 0$

A. f is continuous

B. f is discontinuous

C. $\lim_{x \rightarrow 0^-} f(x) = 3$

D. $\lim_{x \rightarrow 0^+} f(x) = 1$

Answer: A



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370. If $f(x) = \begin{cases} \frac{x}{|x|}, & \text{for } x \neq 0 \\ c, & \text{for } x = 0 \end{cases}$, then f is

A. continuous at $x = 0$

B. discontinuous at $x = 0$

C. continuous if $f(0) = 1$

D. continuous if $f(0) = -1$

Answer: B



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371. If $f(x) = \begin{cases} \frac{|x|}{x}, & \text{for } x \neq 0 \\ 1, & \text{for } x = 0 \end{cases}$, then

A. $\lim_{x \rightarrow 1^-} f(x) = 1$

B. $\lim_{x \rightarrow 1^+} f(x) = -1$

C. f is discontinuous at origin

D. f is continuous at origin

Answer: C



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372. If $f: R \rightarrow R$ is defined by (where $[\cdot]$ is g.i.f) $f(x)[x - 3] + |x - 4|$ for $x \in R$ then $\lim_{x \rightarrow 3^-} f(x) =$

A. 0

B. -1

C. -2

D. 1

Answer: A



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373. If $f(x) = \begin{cases} \frac{\cot x - \cos x}{(\pi - 2x)^3}, & \text{for } x \neq \frac{\pi}{2} \\ k, & \text{for } x = \frac{\pi}{2} \end{cases}$ is continuous at $x = \frac{\pi}{2}$, where ,

then $k =$

A. $\frac{1}{4}$

B. $\frac{1}{24}$

C. $\frac{1}{16}$

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

Answer: C



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374. If $f(x) = \log(\sec^2 x)^{\cot^2 x}$ for $x \neq 0$ for $x=0$ is continuous at $x=0$, then

K is

A. e^{-1}

B. 1

C. e

D. 0

Answer: B



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