MATHS

BOOKS - DEEPTI MATHS (TELUGU ENGLISH)

FUNCTIONS

Solved Examples

1. The number of one - one functions that can be defined from the set B to The set A when $A = \{a_1, a_2, \ldots . a_n\}, B = \{b_1, b_2, \ldots . . b_{n-1}\}$ is

A. 0

B. $(n-1)!$

C. $n!$

D. n^{n-1}

Answer: C

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2. The number of surjections that can be defined from the set $X = \{x_1, x_2, x_3, x_4, x_5\}$ to the set $Y = \{y_1, y_2, y_3\}$ is

A. 0

B. 15

C. 150

D. $.^6 P_5$

Answer: C

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3. The number of constant functions that can be defined from the set $A = \{a_1, a_2, a_3 \ldots, a_n\}$ to the set $B = \{b_1, b_2, \ldots . b_n\}$is

A. n^2

B. $n!$

C. 0

D. n

Answer: D

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4. If $f(x) = \frac{x}{\sqrt{1-x^2}}, g(x) = \frac{x}{\sqrt{1-2x^2}}$ then $(gof)(x)$ is

A. x

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

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

D. 1

Answer: C

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5. If $f(x) = x^2, g(x) = \tan x, h(x) = \log x$ then $[ho(gof)]\left(\sqrt{\pi/4}\right)$ is

A. 0

B. 1

C. 2

D. 4

Answer: A

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6. The domain of the real valued function f defined by $\log|x^2 - 7x + 12|$ is

A. $R - (-3, 4)$

B. $R - \{3, 4\}$

C. $(3, 4]$

D. $[3, 4)$

Answer: B

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7. The domain of the real function f defined by $f(x) = \frac{1}{\sqrt{|x| - x}}$ is

A. $(-\infty, 0)$

B. $(-1, 0)$

C. $(-\infty, 0]$

D. $(0, \infty)$

Answer: A

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8. If $f(x)$ is a polynomial in $x(>0)$ satisfying the equation $f(x) + f(1/x) = f(x).f(1/x)$ then $f(x) =$

A. x^n

B. $x^n + 1$

C. $x^n - 1$

D. 1

Answer: B

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9. The domain of the function $f(x) = \sqrt{\log_{10}\left(\frac{1}{|\sin x|}\right)}$ is

A. $R - \{2n\pi : n \in eZ\}$

B. R

C. $R - \{n\pi : n \in Z\}$

D. $\varnothing$

Answer: C

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10. Let $f(x) = ax + b, a < 0$, then $f^{-1}(x) = f(x) \forall x$ if and only if

A. $a \in -1, b \in R$

B. $a = -2, b = 4$

C. $a = -3, b \in R$

D. none of these

Answer: A

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11. If $a \in R^+$ and $f: R \to R$ is defined by $f(x) = \frac{a^{2x}}{a^{2x} + a}$, then $\Sigma_{r=1}^{10} f\left(\frac{1}{11}\right) =$

A. 11

B. 10

C. 5.5

D. 5

Answer: D

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12. If $f: R - \{0\} \to R$ defined by $4(x) + 5f\left(\frac{1}{x}\right) = \frac{1-x}{x}$ then $f(2) =$

A. $1/2$

B. $7/9$

C. $9/7$

D. 2

Answer: B

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13. Two finite sets A and B have n and 2 elements respectively. The total number of relations from A to B is 240 more than the total number of functions from A to B.

A. 2

B. 3

C. 9

D. 4

Answer: D

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14. If $f: R \to R$ defined by $f(x+y) = f(x) + f(y) - xy - 1$ for all $x, y \in R$ and $f(1) = 1$ then the number of solution of $f(x) + f(y) - xy - 1$ for all $x, y \in R$ and $f(1) = 1$ then the number of solutions of $f(n) = n, n \in N$ is

A. 1

B. 2

C. 3

D. infinite

Answer: A

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15. The number of linear functions of f satisfying $f(x + f(x)) = x + f(x)$ for all $x \in R$ is

A. 0

B. 1

C. 2

D. 4

Answer: C

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16. Let f be a function with domain $[0, 7]$ and $g(x) = |2x + 1|$. Then the domain of $(fog)(x)$ is

A. $[0, 7)$

B. $[-7, 0]$

C. $[-4, 3]$

D. $[-3, 4]$

Answer: C

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17. Two finite sets A and B have n and 2 elements respectively. For $n \geq 2$, if the number of surjections from A to B are 62, then n =

A. 5

B. 6

C. 7

D. 31

Answer: B

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18. If $A = \left\{x \in R : \frac{x-3}{x^3 - 3x^2 + 2x} > 0\right\}$, then A contains

A. $(-3, -1)$

B. $\left(\frac{4}{3}, \frac{3}{2}\right)$

C. $(2, 5)$

D. $\left(\frac{3}{2}, \frac{5}{2}\right)$

Answer: A::B

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Exercise 1 A Functions

1. If a set A contains 10 elements and a set B contains 20 elements then the numbers of functions from A into B is

A. $.^{20}P_{10}$

B. 10×20

C. 10^{20}

D. 20^{10}

Answer:

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2. Set A has n elements. The number of functions that can be defined from A into A is

A. n^2

B. $n!$

C. n^n

D. n

Answer:

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3. The number of constant functions that can be defined from $\{1, 2, \ldots\ldots\ldots, 100\}$ to $\{a, b, c, \ldots\ldots\ldots\ldots, z\}$ is

A. 100

B. 26

C. 100^{26}

D. 26^{100}

Answer:

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4. Set A has 3 elements and set B has 4 elements. The number of injections that can be defined from A into B is

A. 144

B. 12

C. 24

D. 64

Answer:

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5. The number of one one function that can be defined from $\{a, b, c, d\}$ into $\{1, 2, 3, 4, 5, 6\}$ is

A. 4^6

B. 6^4

C. $.^6 P_4$

D. $.^6 C_4$

Answer:

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6. If $n \geq 2$ then the number of surjections that can be defined from $\{1, 2, 3, \ldots . n\}$ to $\{1, 2\}$ is

A. 2n

B. $._n P_2$

C. 2^n

D. $2^n - 2$

Answer:

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7. Set A contains 3 elements and set R contains 2 elements. The number of onto functions from A onto B is

A. 3

B. 6

C. 8

D. 9

Answer:

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8. The number of surjections that can be defined from $\{1, 2, 3, 4, 5\}$ onto $\{a, b\}$ is

A. 10

B. 20

C. 30

D. 32

Answer:

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9. The number of surjections that can be defined from $\{1, 2, 3, 4, 5\}$ onto $\{a, b, c\}$ is

A. 243

B. 150

C. 60

D. 10

Answer:

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10. If $A = \{1, 2, 3, 4, 5\}, B = \{a, b, c, d\}$ then the number of onto functions that can be defined from A to B is

A. 120

B. 240

C. 625

D. 1024

Answer:

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11. The number of bijective functions from set A to itself when A contains 106 elements is

A. 106

B. 106^2

C. $106!$

D. 2^{106}

Answer:

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12. The number of one one functions that can be defined from $\{1, 2, 3, 4\}$ onto $\{a, b, c, d\}$ is

A. 4

B. 4^4

C. $4!$

D. infinite

Answer:

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13. The number of linear functions which map from $[-1, 1]$ onto, $[0, 2]$ is

A. 0

B. 1

C. 2

D. infinite

Answer:

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14. If $f: R \to R$ is defined by $f(x) = x^2 + 3x + 2$, then $f(x-1) =$

A. $x^2 + x$

B. $x^2 - 3x + 2$

C. $x^2 + 2x$

D. $x^2 - x$

Answer:

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15. If $f: R \to R$ is defined by $f(x) = x^2 - 3x + 2$, then $f(x^2 - 3x - 2) =$

A. $x^4 + 1$

B. $x^4 - 2x^2 + 2$

C. $x^4 - 6x^3 + 2x^2 - 3x + 12$

D. $x^4 + 2x + 2$

Answer:

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16. $f(x) = 4x - 1, \quad \text{if} \quad x > 4$

$= x^2 - 2, \quad \text{if} \quad -2 \leq x \leq 3$

$= 3x + 4, \quad \text{if} \quad x < -2.$ Then $f(5) + f(2) + f(-3) =$

A. 5

B. 11

C. 16

D. 19

Answer:

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17. Let $f: R \to R$ be defined by $f(x) = \{(x + 2, (x \leq -1)), (x^2, (-1 \leq x \leq 1)), (2 - x), (x \geq 1)).$

Then the value of $f(-1.75) + f(0.5) + f(1.5)$ is

A. 0

B. 2

C. 1

D. -1

Answer:

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18. If $f(x) = 3^{-x} - 1$, for $-1 \leq x < 0$,

$= \tan(x/2)$, for $0 \leq x < \pi$

$= \dfrac{x}{x^2 - 2}$, for $\pi \leq x < 6$, then $f(-1) + f(\pi/6) + f(5) =$

A. 0

B. $\dfrac{27}{23} - \sqrt{3}$

C. $\dfrac{27}{13} + \sqrt{3}$

D. $\dfrac{97}{23} - \sqrt{3}$

Answer:

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19. If $f(x) = 2x - 1, \quad \text{if} \quad x > 1,$

$= x^2 + 1, \quad \text{if} \quad -1 \leq x \leq 1, \quad \text{then} \quad \dfrac{f(1) + f(3) + f(0)}{f(2) + f(-1) + f(1/2)} =$

A. $32/5$

B. $32/25$

C. $5/32$

D. $25/32$

Answer:

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20. If $f(x) = 4x - 1, \quad \text{if} \quad x > 4,$

$= x^2 - 2, \quad \text{if} \quad -2 \leq x \leq 3,$

$= 3x + 4, \quad \text{if} \quad x < -2, \quad \text{then} \quad \dfrac{f(-3) + f(5) + f(0) + f(-1)}{f(-2) + f(1) + f(-5) + f(3)} =$

A. $11/3$

B. $3/11$

C. $-11/3$

D. $-3/11$

Answer:

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21. If $f(x) = \frac{\cos^2 x + \sin^4 x}{\sin^2 x + \cos^4 x}$ for $x \in R$ then $f(2002) =$

A. 1

B. 2

C. 3

D. 4

Answer:

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22. If

$f(0) = 0, f(1) = 1, f(2) = 2$ and $f(x) = f(x-2) + f(x-3)$ for $x =$

then $f(9) =$

A. 12

B. 13

C. 14

D. 10

Answer:

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23. If $f(x) = \alpha x + \beta$ and $f = \{(1, 1), (2, 3), (3, 5), (4, 7)\}$ then the values of α, β are

A. $2, -1$

B. $-2, 1$

C. $3, \ -1$

D. $-2, \ -1$

Answer:

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24. If $f: R \to R$ defined by $f(x) = 2x + |x|$ then $f(3x) - f(-x) - 4x =$

A. $f(x)$

B. $-f(x)$

C. $f(-x)$

D. $2f(x)$

Answer:

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25. If $f: R \to R$ is defined by $f(x) = 2x + |x|$ then $f(2x) + f(-x) - f(x) =$

A. $2x$

B. $2|x|$

C. $-2x$

D. $-2|x|$

Answer:

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26. If $f(1) = 1, f(n+1) = 2f(n) + 1, n \geq 1$, then $f(n)$ is

A. 2^{n+1}

B. 2^n

C. $2^n - 1$

D. $2^{n-1} - 12$

Answer:

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27. If $f(x) = \log. \frac{1+x}{1-x}$ then $f\left(\frac{x_1 + x_2}{1 + x_1 x_2}\right) =$

A. 0

B. $f(x_1) + f(x_2)$

C. $f(x_1) f(x_2)$

D. $f(x_1, x_2)$

Answer:

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28. If $f(x) = \log. \frac{1-a}{1+a}$ for $0 < a < 1$ then $f\left(\frac{2a}{1+a^2}\right) =$

A. $f(a)$

B. $2f(a)$

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

D. $-f(a)$

Answer:

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29. If $f(a) = \log. \frac{2+a}{2-a}$ for $0 < a < 2$ then $\frac{1}{2}f\left(\frac{8a}{4+a^2}\right) =$

A. $f(a)$

B. $2f(a)$

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

D. $-f(a)$

Answer:

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30. If $e^{f(x)} = \frac{10+x}{10-x}, x \in (-10, 10)$ and $f(x) = kf\left(\frac{200x}{100+x^2}\right)$, then k =

A. 0.5

B. 0.6

C. 0.7

D. 0.8

Answer:

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31. For any integer $n \geq 1$, the number of positive divisors of n is denoted by d(n). Then for a prime P, $d\left(d\left(d\left(p^7\right)\right)\right)$ is equal to

A. 1

B. 2

C. 3

D. p

Answer:

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32. If $\mathbb{N}$ denotes the set of all positive integers and if $f: \mathbb{N} \to N$ is defined by $f(n) =$ the sum of positive divisors of n then $f\left(2^k.3\right)$, where k is a positive integer is

A. $2^{k+1} - 1$

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

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

D. $4\left(2^{k+1} - 1\right)$

Answer:

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33. If $f(x) = \sin[\pi^2]x + \sin[-\pi^2]x$ when $[x]$ is the step function, then $f(\pi/6) =$

A. $-1 + \sqrt{3}/2$

B. $1 + \sqrt{3}/2$

C. $1 - \sqrt{3}/2$

D. 1

Answer:

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34. If $f(x)$ is a polynomial fin $x(>0)$ satisfying the equation $f(x) + f(1/x) = f(x).f(1/x)$ and $f(2) = 9$, then $f(3) =$

A. 26

B. 27

C. 28

D. 29

Answer:

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35. If $f(x)$ is a polynomial function x>0 such that $f(x)f(1/x) = f(x) + f(1/x)$ and $f(2) = 33$ then $f(x) =$

A. $x^3 + 1$

B. $x^5 + 1$

C. $x^3 - 1$

D. $x^5 - 1$

Answer:

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36. If $f(x)$ is a polynomial function such that $f(x)f\left(\frac{1}{x}\right) = f(x) + f\left(\frac{1}{x}\right)$ and $f(3) = -80$ then $f(x) =$

A. $x^4 + 1$

B. $x^4 - 1$

C. $1 - x^4$

D. $-1 - x^4$

Answer:

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37. If $f(x)$ is a function such that $f(x+y) = f(x)f(y)$ and $f(5) = 125$ then $f(x) =$

A. 5

B. x^3

C. 5^x

D. $5x$

Answer:

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38. If $f(x)$ is a function such that $f(xy) = f(x) + f(y)$ and $f(2) = 1$ then $f(x) =$

A. x^2

B. 2^x

C. $\log_2 x$

D. $\log_x 2$

Answer:

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39. If $f(x) = \cos(\log x)$, then show that $f\left(\frac{1}{x}\right).f\left(\frac{1}{y}\right) - \frac{1}{2}\left[f\left(\frac{x}{y}\right) + f(xy)\right] = 0$

A. 0

B. $f(x)$

C. $f(x) + f(y)$

D. $f(x)f(y)$

Answer:

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40. If $f(x) = \sin(\log x)$, then $f(xy) + f(x/y) - 2f(x)\cos(\log y) =$

A. 0

B. $\sin(\log x)$

C. $\cos(\log x)$

D. none

Answer:

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41. If $f_n(x) - \left(\tan. \frac{x}{2}\right)(1+\sec x)(1+\sec 2x).....(1+\sec 2^n x)$ then which of the following is not true?

A. $f_2(\pi/16) = 1$

B. $f_3(\pi/32) = 1$

C. $f_4(\pi/64) = 1$

D. $f_5(\pi/128) = 0$

Answer:

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42. If $f: A \to R$ is defined as $f(x) = x^3 + 1$ and $A = \{1, 2, -1, -2, 0\}$ then the range of f is

A. $\{0, 1, 2, 7, 9\}$

B. $\{-7, 0, 1, 2, 9\}$

C. $\{-9, 0, 1, 2, 7\}$

D. $\{-1, 0, 1, 2, 9\}$

Answer:

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43. If $f: A \to R$ is defined as $f(x) = \cos x$ and $A = \{0, \pi/6, \pi/4, \pi/3\}$ then the range of f is

A. $\{1, 1/2, 1/\sqrt{2}, \sqrt{3}/2\}$

B. $\{1/2, 1/\sqrt{1}, \sqrt{3}/2\}$

C. $\{0, 1/2, 1/\sqrt{2}, 1\}$

D. $\{1, 1/\sqrt{3}, \sqrt{3}\}$

Answer:

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44. If $f: A \to R$ is defined as $f(x) = \tan(x/2)$ and $A\{\pi/2, \pi/3, 2\pi/3\}$ then the range of f is

A. $\{0, 1/2, 1/\sqrt{2}, \sqrt{3}/2\}$

B. $\{1/2, 1/\sqrt{2}, 1, \sqrt{3}/2\}$

C. $\{0, 1/2, 1/\sqrt{2}, 1\}$

D. $\{1, 1/\sqrt{3}, \sqrt{3}\}$

Answer:

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45. If $A = \{3, 0, 1, 2\}$ and $f: A \to B$ is an onto function defined by $f(x) = 3x - 5$, then $B =$

A. $\{-2, -1, 1, 7\}$

B. $\{-1, 3, 7, 8\}$

C. $\{-5, -2, 1, 4\}$

D. none

Answer:

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46. If $f: [2, \infty) \to B$ defined by $f(x) = x^2 - 4x + 5$ is a bijection, then $B =$

A. $[0, \infty)$

B. $[1, \infty)$

C. $[4, \infty)$

D. $[5, \infty)$

Answer:

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47. If $f: \mathbb{R} \to \mathbb{R}$ is defined by $f(x) = x - [x] - \frac{1}{2}$ for $x \in \mathbb{R}$, where $[x]$ is the greatest integer not exceeding x, then $\left\{x \in \mathbb{R}: f(x) = \frac{1}{2}\right\} =$

A. Z the set of all integers

B. $\mathbb{N}$ the set of all natural numbers

C. $\varnothing$ the empty set

D. $\mathbb{R}$

Answer:

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48. If $f: \mathbb{R} \to \mathbb{R}$ is defined by $f(x) = \left[\frac{x}{2}\right]$ for $x \in \mathbb{R}$, where $[y]$ denotes the greatest integer not exceeding, y then $\{f(x): |x| < 71\} =$

A. $\{-14, -13, \ldots\ldots, 0, \ldots\ldots, 13, 14\}$

B. $\{-14, -13, \ldots\ldots\ldots, 0, \ldots\ldots\ldots, 14, 15\}$

C. $\{-15, -14, \ldots\ldots\ldots\ldots, 0, \ldots\ldots\ldots\ldots, 14, 15\}$

D. $\{-15, -14, \ldots\ldots\ldots\ldots\ldots\ldots, 0, \ldots\ldots\ldots\ldots\ldots 13, 14\}$

Answer:

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49. $A = \{1, 2, 3, 4, 5\}$, $B = \{1, 4, 7, 10, 13\}$. If f from A into B defined by $f(x) = 3x - 2$. Then f is

A. a function

B. one one

C. onto

D. one one onto

Answer:

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50. $A = \{-1, 0, 2, 5, 6, 11\}, B = \{2, -1, 1, 0, 11, 108\}$ and $f(x) = x^2 - x - 2$, then f from A into B is

A. function

B. one one

C. onto

D. not a function

Answer:

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51. $A = \{-1, 0, 1, 2\}, B = \{2, 3, 6\}$. If f from A into B defined by $f(x) = x^2 + 2$, then f is

A. a function

B. one one

C. onto

D. one one onto

Answer:

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52. If $A = \{1, 2, 3\}, B = \{a, b, c, d\}, f = \{(1, a), (2, b), (3, d)\}$, then f is

A. mapping

B. one one

C. onto

D. one - one - onto

Answer:

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53. If $A = \{a, b, c\}, B = \{x, y\}, f = \{(a, x), (b, y), (c, x)\}$ then f is ..... mapping

A. onto

B. one one

C. one one onto

D. none

Answer:

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54. $A = \{a, b, c\}, B = \{2, 1, 0\}, f = \{(a, 2), (b, 0), (c, 2)\}$. Then f is

A. a function

B. a one one function

C. an onto function

D. a one one onto function

Answer:

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55. f and h are from A into B where $A = \{a, b, c, d\}, B = \{s, t, u\}$ defined as $f(a) = t, f(b) = s, f(c) = s, f(d) = u, h(a) = s, h(b) = t, h(c) = s, h(a)$. Which one of the following statement is true

A. f and h are functions

B. f is a function and h is not a function

C. f and h are not functions

D. f is not a function and h is a function

Answer:

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56. Define $f: Z \to Z$ by $f(x) = \begin{cases} x/2 & (\text{x is even}) \\ 0 & (\text{x is odd}) \end{cases}$ then f is

A. onto but not one - one

B. one - one but not onto

C. one - one and onto

D. neither one - one nor onto

Answer: 1

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57. The function $f: N \to Z$ defined by $f(n) = \frac{n-1}{2}$ when n is odd and $f(n) = \frac{-n}{2}$ when n is even, is

A. one one but not onto

B. onto but not one one

C. one one onto

D. neither one one nor onto

Answer: 3

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58. If $f: R \to (0, 1]$ is defined by $f(x) = \frac{1}{x^2 + 1}$, then f is

A. a function

B. one one

C. onto

D. one one onto

Answer: C

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59. $f: R^+ \to R$ defined by $f(x) = 2^x, x \in (0, 1), f(x) = 3^x, x \in [1, \infty)$ is:

A. onto

B. one - one

C. not one - one

D. a bijection

Answer:

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60. If $f(x) = |x - 1| + |x - 2| + |x - 3|$ when $2 < x < 3$ is

A. one - one function only

B. an onto function only

C. an identity function

D. an into function only

Answer: 3

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61. $f: R \to R$ defined by $f(x) = e^{|x|}$ is

A. one - one onto

B. one - one

C. onto

D. mapping

Answer:

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62. If $\mathbb{R} \to C$ is defined by $f(x) = e^{2ix} f$ or $x \in \mathbb{R}$ then, f is (where C denotes the set of all complex numbers)

A. one - one

B. onto

C. one - one and onto

D. neither one - one nor onto

Answer: 4

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63. $f(x) = \dfrac{2^{|x|}}{\sin x}$ is

A. even

B. odd

C. Neither even nor odd

D. both even and odd

Answer:

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64. If $f(x) = \frac{a^{2x} - a^{-2x}}{a^{2x} + a^{-2x}}$, then $f(x)$ is

A. even

B. odd

C. none of these

D. cannot be determined

Answer:

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65. $x\left(\frac{a^x + 1}{a^x - 1}\right)$

A. is an even function

B. is an odd function

C. is neither even nor odd

D. none

Answer:

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

A. is an even function

B. is an odd function

C. is neither even nor odd

D. cannot be determined

Answer:

Watch Video Solution

67. Which of the following is an even function

A. $f(x) = \dfrac{a^x + a^{-x}}{a^x - a^{-x}}$

B. $f(x) = \dfrac{a^x + 1}{a^x - 1}$

C. $f(x) = x\dfrac{a^x - 1}{a^x + 1}$

D. $f(x) = \log_2\left(x + \sqrt{x^2 + 1}\right)$

Answer:

Watch Video Solution

68. Which of the following is an odd function

A. $f(x) = \cos x$

B. $f(x) = 2^{-x^2}$

C. $f(x) = 2^{x - x^4}$

D. $f(x) = x^3 - x$

Answer:

Watch Video Solution

69. $f(x)$ is an odd polynomial function. Then $\cos[f(x)]$ is

A. an even function

B. an odd function

C. Neither even nor odd

D. none

Answer:

Watch Video Solution

70. Determine whether the function $f(x) = \log\left(x + \sqrt{x^2 + 1}\right)$ is even or odd.

A. an even function

B. an odd function

C. periodic function

D. neither even nor odd function

Answer:

Watch Video Solution

71. $\dfrac{\log\left(x + \sqrt{x^2 + 1}\right)}{x}$ is

A. an even function

B. an odd function

C. Neither even nor odd

D. none

Answer:

Watch Video Solution

72. If $f(x) = \frac{\cos x + \sin x}{\tan x + \cot x}$ then function $f(x)$ is

A. even

B. odd

C. both even and odd

D. neither odd nor even

Answer:

Watch Video Solution

73. Let $f(x) = \frac{x}{e^x - 1} + \frac{x}{2} + 1,$ then f is

A. an odd function

B. an even function

C. periodic function

D. none of these

Answer:

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74. If f from R is defined by $f(x) = x^2$, then $f^{-1}\{16\} =$

A. $\{4\}$

B. $\{-4\}$

C. $\{\pm 4\}$

D. does not exsit.

Answer:

Watch Video Solution

75. If f from R into R defined by $f(x) = x^3 - 1,$ then $f^{-1}\{-2, 0, 7\} =$

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

B. $\{0, 1, 2\}$

C. $\{\pm 1, \pm 2\}$

D. $\{0, \pm 2\}$

Answer:

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76. $f: R \to R$ defined by $f(x) = x^3 + x^2 - x - 1.$ Then the inverse image set of $\{0\}$ is

A. $\{0\}$

B. $\{1, 0, -1\}$

C. $\{0, -1\}$

D. $\{1, -1\}$

Answer: 4

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77. Let f be an injective function with domain $\{x, y, z\}$ and range $\{1, 2, 3\}$ such that exactly one of the following statements is correct and the remaining are false. $f(x) = 1$, $f(y) \neq 1$, $f(z) \neq 2$. The value of $f^{-1}(1)$ is

A. x

B. y

C. z

D. none

Answer: 2

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78. If $f = \{(a, 0), (b, 2), (c, -3)\}, g = \{(a, -1), (b, 1), (c, 2)\}$ then $2f - 3g =$

A. $\{(a, -1), (b, 3), (c, -1)\}$

B. $\{(a, 1), (b, 1), (c, -5)\}$

C. $\{(a, -1), (b, -1), (c, 5)\}$

D. $\{(a, 3), (b, 1), (c, -12)\}$

Answer:

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79. If $f = \{(a, 1), (b, -2), (c, 3)\}, g = \{(a, -2), (b, 0), (c, 1)\}$ then $f^2 + g^2 =$

A. $\{(a, -1), (b, -2), (c, 4)\}$

B. $\{(a, 3), (b, -2), (c, 2)\}$

C. $\{(a, -4), (b, -4), (c, 9)\}$

D. $\{(a, 5), (b, 4), (c, 10)\}$

Answer:

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80. If $f = \{(a, 0), (b, -2), (c, 3)\}, g = \{a, -2), (b, 0), (c, 1)\}$ then $f/g =$

A. $\{(a, -1), (b, -2), (c, 4)\}$

B. $\{(a, 3), (b, -2), (c, 2)\}$

C. $\{(a, 0), (c, 3)\}$

D. does not exsit.

Answer:

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81. If $f = \{(-2, 4), (0, 6), (2, 8)\}$ and $g = \{(-2, -1), (0, 3), (2, 5)\}$, then $\left(\frac{2f}{3g} + \frac{3g}{2f}\right)(0) =$

A. $1/12$

B. $25/12$

C. $5/12$

D. $13/12$

Answer:

Watch Video Solution

82. If $f: \{(1, 2), (2, 3), (3, 1)\}$, then $fof =$

A. $\varnothing$

B. f

C. $\{(1, 3), (2, 1), (3, 2)\}$

D. $\{(1, 1), (2, 2), (3, 3)\}$

Answer:

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83. If $f = \{(1, a), (2, b), (1, b), (3, c), (1, c)\}, g = (a, p), (b, r), (c, q), (c, p)\}$, then $(gof)^{-1} =$

A. $\{(p, 1), (q, 1), (r, 2), (r, 1), (q, 3), (p, 3)\}$

B. $\{(1, p), (1, q), (2, r), (1, r), (3, q), (3, p)\}$

C. $\{(p, 1), (1, q), (r, 2), (1, r), (q, 3), (3, p)\}$

D. $\{(1, p), (q, 1), (2, r), (r, 1), (3, q), (p, 3)\}$

Answer: 1

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84. If $f(x) = 2x - 1, g(x) = x^2$, then $(3f - 2g)(x) =$

A. $5x - x^2 + 9$

B. $6x - 5x^2 - 4$

C. $2x - x^2 - 3$

D. $6x - 2x^2 - 3$

Answer:

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85. If $f(x) = x^2, g(x) = x^2 - 5x + 6$ then $\frac{g(2) + g(2) + g(0)}{f(0) + f(1) + f(-2)} =$

A. 2

B. 1

C. $5/6$

D. $6/5$

Answer:

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86. $f(x) = 1$, if x rational,

$= 0,$ if x is irrational. Then $\frac{f(1/2) + f\left(\sqrt{5}\right)}{(fof)\left(\sqrt{3}\right)} =$

A. 0

B. 1

C. 2

D. $1/2$

Answer:

Watch Video Solution

87. Two functions $f: R \to R, g: R \to R$ are defined as follows :

$f(x) = \begin{cases} 0 & (\text{x rational}) \\ 1 & (\text{x irrational}) \end{cases}$, $g(x) = \begin{cases} -1 & (\text{x rational}) \\ 0 & (\text{x irrational}) \end{cases}$ then

$(fog)(\pi) + (gof)(e) =$

A. -1

B. 0

C. 1

D. 2

Answer:

Watch Video Solution

88. If $f: R \to R$ is defined by $f(x) = 3x - 2$, then $(f_o f)(x) + 2 =$

A. $f(x)$

B. $2f(x)$

C. $3f(x)$

D. $-f(x)$

Answer:

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89. If $f(x)=\sqrt{x^3-1}$ and $g(x)=\sqrt[3]{x^2+1}$, then $(fog)(x)=$

A. x

B. x^2

C. x^3

D. none

Answer:

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90. $f: R \to R$, defined by $f(x) = \sin x$ and $g: R \to R$, defined by $g(x) = x^2, (f_o g)(x) =$

A. $x^2 + \sin x$

B. $x^2 \sin x$

C. $\sin^2 x$

D. $\sin x^2$

Answer: D

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91. If $f: R \to R, g: R \to R$ are defined by $f(x) = x^2 + 2x - 3, g(x) = 3x - 4$, then $(fog)(-1) =$

A. 165

B. 32

C. 16

D. -16

Answer: B

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92. If $f: R \to R, g: R \to R$ are defined by $f(x) = 4x - 1, g(x) = x^3 + 2,$ then $(gof)\left(\frac{a+1}{4}\right) =$

A. 43

B. 345

C. $a^3 + 2$

D. $a^2 - 1$

Answer:

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93. If $f: R \to R, g: R \to R$ are defined by $f(x) = 3x - 2, g(x) = x^2 + 1$, then $(fog)\left(x^2 + 1\right) =$

A. $3x^4 + 6x^2 + 4$

B. $9x^2 - 1$

C. $3x^2 + 1$

D. $3x^2 - 1$

Answer:

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94. Let $g(x) = 1 + x - [x]$ and $f(x) = -1$ if $x < 0$

$= 0$ if $x = 0$ then $f[g(x)] =$

$= 1$ if $x > 0$

A. x

B. 1

C. $f(x)$

D. $g(x)$

Answer:

Watch Video Solution

95. If $f(x) = \begin{cases} x^3 + 1, & x < 0 \\ x^2 + 1, & x \geq 0 \end{cases}, g(x) = \begin{cases} (x-1)^{1/3}, & x < 1 \\ (x-1)^{1/2}, & x \geq 1 \end{cases}$ then $(gof)(x) =$

A. x

B. x^2

C. x^3

D. 1

Answer:

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96. If $f(x) = x^3 - x, g(x) = \sin 2x$, then

A. $g\{f(2)\} = \sin 2$

B. $g\{f(1)\} = 1$

C. $f\{g(\pi/12)\} = -3/8$

D. $f\{f(1)\} = 2$

Answer:

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97. If $f(x) = \log x, g(x) = x^3$ then $f[g(a)] + f[g(b)] =$

A. $f[g(a) + g(b)]$

B. $f[g(ab)]$

C. $3[f(ab)]$

D. $g[f(a) + f(b)]$

Answer:

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98. If $f: R \to R$ and $g: R \to R$ are defined by $f(x) = 2x + 3, g(x) = x^2 + 7$ then the value of x for which $f[g(x)] = 25$ are

A. ± 1

B. ± 2

C. ± 3

D. ± 4

Answer:

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99. If $f: \mathbb{R} \to \mathbb{R}$ and $g: \mathbb{R} \to \mathbb{R}$ are defined by $f(x) = 2x + 3$ and $g(x) = x^2 + 7$, then the values of x such that $g(f(x)) = 8$ are

A. 1, 2

B. $-1, 2$

C. $-1, -2$

D. $1, -2$

Answer:

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100. Suppose $f: [-2, 2] \to \mathbb{R}$ is defined by $f(x) = \begin{cases} -1 & \text{for } -2 \leq x \leq 0 \\ x - 1 & \text{for } 0 \leq x \leq 2 \end{cases}$, then $\{x \in [-2, 2]: x \leq 0 \text{ and } f(|x|) = x\} =$

A. $\{-1\}$

B. $\{0\}$

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

D. $\varnothing$

Answer: 3

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101. Let Q be the set of all rational number in $[0, 1]$ and $f: [0, 1] \to [0, 1]$ be defined by $f(x) = \begin{cases} x & \text{for} \quad x \in Q \\ 1 - x & \text{for} \quad x \notin Q \end{cases}$ Then the set $S = \{x \in [0, 1](fof)(x) = x\}$ is equal to

A. Q

B. $[0, 1] - Q$

C. $(0, 1)$

D. $[0, 1]$

Answer:

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102. If $f: R \to R$ and $g: R \to R$ are given by $f(x) = |x|$ and $g(x) = \{x\}$ for each $x \in R$, then $|x \in R: g(f(x)) \leq f(g(x))\} =$

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

B. $(-\infty, 0)$

C. Z

D. R

Answer:

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103. If $g[f(x)] = |\sin x|$, $f[g(x)] = \left(\sin \sqrt{x}\right)^2$ then

A. $f(x) = \sin^2 x, g(x) = \sqrt{s}$

B. $f(x) = \sin x, g(x) = |x|$

C. $f(x) = x^2, g(x) = \sin\sqrt{x}$

D. f, g cannot be determined

Answer:

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104. If $g[f(x)] = |\sin x|, f[g(x)] = \left(\sin\sqrt{x}\right)^2$ then

A. $f(x) = x^2, g(x) = \sin\sqrt{x}$

B. $f(x) = \sin x, g(x) = |x|$

C. $f(x)\sin^2 x, g(x) = \sqrt{x}$

D. $f(x) = x^2, g(x) = \sqrt{x}$

Answer:

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105. If $f(n) = (-1)^{n-1}(n-1)$ and $g(n) = n - f(n) \forall n \in N$ then $(gog)(n) =$

A. 1

B. 0

C. -1

D. n

Answer:

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106. If $f(x) = (p - x^n)^{\frac{1}{n}}$,$p > 0$ and$n$ is a positive integer then $f[f(x)]$ is equal to

A. x

B. x^n

C. $p^{1/n}$

D. $p - x^n$

Answer:

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107. If $f(x) = \left(25 - x^4\right)^{1/4}$ for $0 < x < \sqrt{5}$ then $f\left(f\left(\frac{1}{2}\right)\right) =$

A. 2^{-4}

B. 2^{-3}

C. 2^{-2}

D. 2^{-1}

Answer:

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108. If $f:[-6,6] \to \mathbb{R}$ defined by $f(x) = x^2 - 3$ for $x \in R$ then $(fofof)(-1) + (fofof)(0) + (fofof)(1) =$

A. $f\left(4\sqrt{2}\right)$

B. $f\left(3\sqrt{2}\right)$

C. $f\left(2\sqrt{2}\right)$

D. $f\left(\sqrt{2}\right)$

Answer:

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109. If $f(x) = \frac{1}{\sqrt{x + 2\sqrt{2x-4}}} + \frac{1}{\sqrt{x - 2\sqrt{2x-4}}}$ for $x > 2$ then $f(11) =$

A. $7/6$

B. $5/6$

C. $6/7$

D. $5/7$

Answer:

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110. If $f(x) = \sin^2 x + \sin^2(x + \pi/3) + \cos x \cos(x + \pi/3)$ and $g(5/4) = 1$ then $(gof)(x) =$

A. 1

B. 0

C. $\sin x$

D. none

Answer:

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111. If $f(x) = \cos^2 x + \cos^2(x + 60^\circ) + \cos^2(x - 60^\circ)$ and $g(3/2) = 5$ then $(gof)(x) =$

A. 0

B. 1

C. 5

D. $15/2$

Answer:

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112. If $y = f(x) = \dfrac{2x - 1}{x - 2}$, then $f(y) =$

A. x

B. y

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

D. $y - 2$

Answer:

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113. If $f(x) = \frac{3x-7}{5x-3}$ then $(fof)(x) =$

A. x

B. $-x$

C. $3x$

D. $f(x)$

Answer:

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114. If $f(x) = -|x|$, then $(fofof) =$

A. $-f$

B. $|f|$

C. f

D. $-|f|$

Answer:

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115. If $f(x) = \frac{x}{\sqrt{1-x^2}}, g(x) = \frac{x}{\sqrt{1+x^2}}$ then $(fog)(x) =$

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

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

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

D. x

Answer:

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116. If $f(x) = \log. \dfrac{1+x}{1-x}$ and $g(x) = \dfrac{3x + x^3}{1 + 3x^2}$ then $(fog)(x) =$

A. $f(x)$

B. $2f(x)$

C. $3f(x)$

D. $4f(x)$

Answer:

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117. If $f(x) = \dfrac{x}{\sqrt{1-x^2}}$ then $(fofof)(x) =$

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

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

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

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

Answer:

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118. If $f(x) = \frac{x}{\sqrt{1+x^2}}$, then $(fofof)(x) =$

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

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

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

D. none

Answer:

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119. If $f(x) = [x], g(x) = x - [x]$ then which of the following functions is the zero function

A. $(f+g)(x)$

B. $(fg)(x)$

C. $(f-g)(x)$

D. $(fog)(x)$

Answer:

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120. If $f: Rr \to \mathbb{R}$ and $g: \mathbb{R} \to \mathbb{R}$ are defined by $f(x) = |x|$ and $g(x) = [x-3]$ for $x \in \mathbb{R}$, then $\{g(f(x)): -8/5 < x < 8/5\} =$

A. $\{0, 1\}$

B. $\{1, 2\}$

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

D. $\{2, 3\}$

Answer:

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121. If $f(x)$ is defiend on $[0, 1]$ as $f(x) = \begin{cases} x, & \text{if } x \in Q \\ 1 - x, & \text{if } x \notin Q \end{cases}$ then $(fof)(x) =$

A. 1

B. x

C. $1 - x$

D. $1 + x$

Answer:

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122. If $f(x) = \frac{1}{2}\left[3^x + 3^{-x}\right], g(x) = \frac{1}{2}\left[3^x - 3^{-x}\right]$ then $f(x)g(y) + f(y)g(x) =$

A. $f(x+y)$

B. $g(x+y)$

C. $2f(x)$

D. $2g(x)$

Answer:

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123. If $f: A \to B, g: B \to C$ are two bijective functions then prove that $gof: A \to C$ is also a bijective function.

A. a

B. not a

C. need not a

D. none

Answer:

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124. If $f: A \to B$ is a bijective function then prove that

(ii) $f^{-1}of = I_A$.

A. fof^{-1}

B. f

C. f^{-1}

D. I_A (Identify map of the set A)

Answer:

Watch Video Solution

125. To have inverse for the funciton f, f is

A. one one

B. onto

C. one one onto

D. identify function

Answer:

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126. $f: R \to R$ is a function defined by $f(x) = 10x - 7$. If $g = f^{-1}$ then $g(x) =$

A. $\frac{1}{10x - 7}$

B. $\frac{1}{10x + 7}$

C. $\frac{x + 7}{10}$

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

Answer:

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127. If $f: R \to R$ is defined by $f(x) = \frac{2x+1}{3}$ then $f^{-1}(x) =$

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

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

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

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

Answer:

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128. Let $f: N\overrightarrow{Y}$ be a function defined as $f(x) = 4x+3$, where $Y = \{y \in N: y = 4x+3 \text{ for some } x \in N\}$. Show that f is invertible and its inverse is (1) $g(y) = \frac{3y+4}{3}$ (2) $g(y) = 4 + \frac{y+3}{4}$ (3) $g(y) = \frac{y+3}{4}$ (4) $g(y) = \frac{y-3}{4}$

A. $g(y) = 4 + \frac{y+3}{4}$

B. $g(y) = \frac{y+3}{4}$

C. $g(y) = \frac{y-3}{4}$

D. $g(y) = \frac{3y+4}{4}$

Answer:

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129. If $f: R - \{5/2\} \to R - \{-1\}$ defined by $f(x) = \frac{2x+3}{5-2x}$ then $f^{-1}(x) =$

A. $\frac{5x-3}{2+2x}$

B. $\frac{4x+3}{x+1}$

C. $\frac{7+5x}{3-2x}$

D. $\frac{2-5x}{3+7x}$

Answer:

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130. If $f: R \to R^+$ such that $f(x) = (1/3)^x$, then $f^{-1}(x) =$

A. $(1/3)^{-x}$

B. 3^x

C. $\log_{1/3} x$

D. $\log_e(1/3)$

Answer:

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131. If $f: [1, \infty) \to [2, \infty)$ is given by $f(x) = x + \frac{1}{x}$ then $f^{-1}(x) =$

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

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

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

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

Answer:

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132. If $f: R^+ \to R$ such that $f(x) = \log_3 x$ then $f^{-1}(x) =$

A. $\log x^3$

B. 3^x

C. 3^{-x}

D. $3^{1/x}$

Answer:

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133. If $f: \{1, 2, 3, \ldots\ldots\} \to \{0, \pm 1, \pm 2, \ldots\ldots\}$ is defined by $f(x) = \begin{cases} n/2 & \text{if n is even} \\ -\left(\frac{n-1}{2}\right) & \text{if n is odd} \end{cases}$ then $f^{-1}(-100)$ is

A. 100

B. 199

C. 201

D. 200

Answer:

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134. The inverse of $f(x) = \frac{10^x - 10^{-x}}{10^x + 10^{-x}} =$

A. $\log_{10}(2 - x)$

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

C. $\frac{1}{2}\log_{10}(2x - 1)$

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

Answer:

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135. Let $f: D \to R$, where D is the domain of f. Find the inverse of f if it exists: $f(x) = \left(4 - (x-7)^3\right)^{1/5}$

A. $7 + \left[\left(4 - x^5\right]\right]^{1/3}$

B. $\left[7 + \left(4 + x^5\right)\right]^{1/3}$

C. $\left[7 - \left(4 - x^5\right)\right]^{1/3}$

D. $\left[7 - \left(4 + x^5\right)\right]^{1/3}$

Answer:

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136. If $f[1, \infty) \to [1, \infty)$ is defined by $f(x) = 2^{x(x-1)}$ then $f^{-1}(x) =$

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

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

C. $\frac{\left(1-\sqrt{1+4\log_2 x}\right)}{2}$

D. none

Answer:

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137. If $f(x)=x-x^2+x^3-x^4+\ldots.\infty$ when $|x|<1$ then $f^{-1}(x)=$

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

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

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

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

Answer:

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138. If $f: R \to R, g: R \to R$ are defined by $f(x) = 5x - 3, g(x) = x^2 + 3$, then $\left(gof^{-1}\right)(3) =$

A. $25/9$

B. $111/25$

C. $9/25$

D. $25/111$

Answer:

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139. If $f: R \to$ and $g: R \to R$ are defined by $f(x) = 3x - 4$ and $g(x) = 2 + 3x$ then $\left(g^{-1} \text{ of}^{-1}\right)(5) =$

A. 1

B. $1/2$

C. $1/3$

D. $1/5$

Answer:

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140. If $f(x) = (x+1)^2 - 1, x \geq -1$ then the set $S = \{x, f(x) = f^{-1}x\}$ is

A. $\left\{0, -1, \frac{-3+i\sqrt{3}}{2}, \frac{-3-i\sqrt{3}}{2}\right\}$

B. $\{0, 1, -1\}$

C. $\{0, -1\}$

D. $\varnothing$

Answer: 3

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Exercise 1 B Domains Ranges Of Real Functions

1. The domain of $f(x) = \dfrac{x^2 - 2x + 3}{x^2 + x - 6}$ is

A. $(-\infty, -3) \cup (-3, 2) \cup (2, \infty)$

B. $(-\infty, -3) \cup (-3, 2)$

C. $(-\infty, -3) \cup (2, \infty)$

D. none

Answer:

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2. The domain of $\dfrac{2x^2 - 5x + 7}{(x-2)(x-3)(x-5)}$ is

A. $\{2, 3, 5\}$

B. $R \cup \{2, 3, 5\}$

C. $R - \{-2, -3, -5\}$

D. $R - \{2, 3, 5\}$

Answer:

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3. $\left\{x \in \mathbb{R} : \frac{2x-1}{x^3+4x^2+3x} \in \mathbb{R}\right\} =$

A. $\mathbb{R} - \{0\}$

B. $\mathbb{R} - \{0, 1, 3\}$

C. $\mathbb{R} - \{0, -1, -3\}$

D. $\mathbb{R} - \{0, -1, -3, +1/2\}$

Answer: 3

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4. The domain of $f(x) = \frac{1}{x^2+1}$ is

A. R

B. $R - \{1\}$

C. e

D. none

Answer:

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5. The domain of $\frac{1}{|x| - x}$ is

A. R

B. $(0, \infty)$

C. $(-\infty, 0)$

D. $R - \{0\}$

Answer:

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6. The domain of the real function f defined by $f(x) = \frac{1}{\sqrt{|x| - x}}$ is

A. $(-\infty, 0)$

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

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

D. $(0, \infty)$

Answer:

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7. The domain of $\sqrt{4 - x^2}$ is

A. $(-2, 2)$

B. $[-2, 2]$

C. $(-\infty, -2) \cup (2, \infty)$

D. $(-\infty, 2] \cup [2, \infty)$

Answer:

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8. Find the domain of the real function $f(x) = \sqrt{x^2 - 25}$

A. $(-5, 5)$

B. $[-5, 5]$

C. $(-\infty, -5) \cup (5, \infty)$

D. $(-\infty, -5] \cup [5, \infty)$

Answer:

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9. Find the domain of $\sqrt{x^2 - 3x + 2}$

A. $(1, 2)$

B. $[r, 2]$

C. $(-\infty, 1) \cup (2, \infty)$

D. $(-\infty, 1] \cup [2, \infty)$

Answer:

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10. The domain of $\sqrt{(x-5)(7-x)}$ is

A. $(5, 7)$

B. $[5, 7]$

C. $(-\infty, 5) \cup (7, \infty)$

D. $(-\infty, 5] \cup [7, \infty)$

Answer:

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11. The domain of $\sqrt{(x-1)(x-2)(x-3)}$ is

A. $(1, 2)$

B. $[1, 2]$

C. $(1, 2) \cup (3, \infty)$

D. $[1, 2] \cup [3, \infty)$

Answer:

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12. The domain of the function $f(x) = \frac{2x+3}{\sqrt{x-2}(3-x)}$ is

A. $(2, 3)$

B. $(-2, -3)$

C. $(3, 7)$

D. $(3, 11)$

Answer:

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13. The domain of $\frac{1}{\sqrt{x^2-16}}$ is

A. $(-4, 4)$

B. $[-4, 4]$

C. $(-\infty, -4) \cup (4, \infty)$

D. $(-\infty, -4] \cup [4, \infty)$

Answer:

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14. The domain of $\frac{1}{\sqrt{x^2-3x+2}}$ is

A. $(1, 2)$

B. $[1, 2]$

C. $(-\infty, 1) \cup (2, \infty)$

D. $(-\infty, 1] \cup [2, \infty)$

Answer:

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15. The domain of $\frac{1}{\sqrt{[x]^2 - [x] - 6}}$ is

A. $(-2, 3)$

B. $[-2, 3]$

C. $(-\infty, -2) \cup [4, \infty)$

D. $(-\infty, -2] \cup [3, \infty)$

Answer:

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16. The domain of the function $f(x) = \sqrt{\left[\frac{2x-1}{x^2-10x-11}\right]}$ is

A. $x < 0$

B. $x > 0$

C. R

D. $R - \{-1, 11\}$

Answer: 4

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17. The domain of $\log (x-3)(5-x)$ is

A. $(3, 5)$

B. $[3, 5]$

C. $(-\infty, 3) \cup (5, \infty)$

D. $(-\infty, 3] \cup [5, \infty)$

Answer:

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18. If $f(x) = \log(x-5)(2-x), g(x) = \log(x-5), h(x) = \log(2-x)$ then

A. $f(x) = g(x) + h(x)$

B. $f(x) = g(x) - h(x)$

C. $f(x) = g(x)h(x)$

D. none

Answer:

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19. The domain of $\frac{1}{\log(1-x)}$ is

A. $(-\infty, 1)$

B. $(1, \infty)$

C. $(-\infty, 0) \cup (0, 1)$

D. $(-\infty, 0) \cup (0, 1]$

Answer: 3

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20. The domain of $\frac{1}{\log|x|}$ is

A. $R - \{0, 1\}$

B. $R - \{0, -1\}$

C. $R - \{0, \pm 1\}$

D. $R - \{\pm 1\}$

Answer:

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21. The domain of $\log_7|x|$ is

A. $(0, \infty)$

B. $(-\infty, 0)$

C. $[0, \infty)$

D. $R - \{0\}$

Answer:

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22. The domain of $e^{\sqrt{x}}$ is

A. $(0, \infty)$

B. $(-\infty, 0)$

C. $[0, \infty)$

D. R

Answer:

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23. The domain of $\log_x e$ is

A. $(0, 1) \cup (1, \infty)$

B. $(0, 2) \cup (2, \infty)$

C. $(0, 1) \cup (2, \infty)$

D. R

Answer: 1

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24. The domain of $f(x) = \frac{1}{6}\sqrt{\log_{10}(5x - x^2)}$ is

A. $(0, 5)$

B. $(1, 4)$

C. $(1, 3)$

D. $\left[\frac{5-\sqrt{21}}{2}, \frac{5+\sqrt{21}}{2}\right]$

Answer:

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25. The domain of $f(x) = \sqrt{\log_{10}\left[\left(5x - x^2\right)/4\right]}$ is

A. $[0, 5]$

B. $[1, 4]$

C. $[-1, 2]$

D. none

Answer:

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26. The domain of $\log_{10}\left(x^3 - x\right)$ is

A. $(-1, 0) \cup (1, \infty)$

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

C. $(-\infty, 0) \cup (1, \infty)$

D. $(-\infty, -1) \cup (0, \infty)$

Answer:

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27. The domain of $\tan 3x$ is the domain of

A. $\cot 3x$

B. $\cos 3x$

C. $\sec 3x$

D. $\sin 3x$

Answer:

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28. The domain of $\cot(3-2x)$ is

A. $R-\{n\pi : n \in Z\}$

B. $R-\left\{(2n+1)\frac{\pi}{2} : n \in Z\right\}$

C. $R-\left\{\frac{n\pi+3}{2} : n \in Z\right\}$

D. $R-\left\{\frac{n\pi+2}{3} : n \in Z\right\}$

Answer: 3

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29. The domain of $\sec 5x$ is

A. $R - \{n\pi : n \in Z\}$

B. $R - \{2n+1)\frac{\pi}{2} : n \in Z\}$

C. $R - \left\{\frac{n\pi}{5} : n \in Z\right\}$

D. $R - \left\{(2n+1)\frac{\pi}{10} : n \in Z\right\}$

Answer: 4

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30. The domain of $\text{cosec}\ \ 4x$ si

A. $R - \{n\pi : n \in Z\}$

B. $R - \left\{(2n+1)\frac{\pi}{2}, n \in Z\right\}$

C. $R - \left\{\frac{n\pi}{4}, n \in Z\right\}$

D. $R - \left\{(2n+1)\frac{\pi}{8}, n \in Z\right\}$

Answer: 3

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31. The domain of the function $f(x) = \frac{\tan 2x}{6\cos x + 2\sin 2x}$ is `

A. $R - \left\{(2n+1)\frac{\pi}{2}, n \in Z\right\}$

B. $R - \left\{(2n+1)\frac{\pi}{4}, n \in Z\right\}$

C. $R - \left\{(2n+1)\frac{\pi}{2}, n \in Z\right\} \cup \left\{(2n+1)\frac{\pi}{4}, n \in Z\right\}$

D. none

Answer: 3

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32. If $f(x) = |\sin x|$ has an inverse if its domain is

A. $[0, \pi]$

B. $[0, \pi/2]$

C. $[-\pi/4, \pi/4]$

D. $[-\pi/2, \pi/2]$

Answer: 2

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33. The domain fo $f(x) = \frac{1}{|\sin x| + \sin x}$ is

A. R

B. $\bigcup_{n \in Z} (2n+1)\pi, 2(n+2)\pi$

C. $\bigcup_{n \in Z} (2n\pi, (2n+1)\pi)$

D. $\varnothing$

Answer:

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34. The domain of $\sin^{-1} x$ is

A. $(0, 2\pi)$

B. $[-1, 1]$

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

D. $(-1, 1)$

Answer:

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35. The domain of $\sin^{-1}(2x - 7)$ is

A. $(3, 4)$

B. $[3, 4]$

C. $\left(-\frac{\pi}{4} + \frac{7}{2}, \frac{\pi}{4} + \frac{7}{2}\right)$

D. $\left[-\frac{\pi}{4} + \frac{7}{2}, \frac{\pi}{4} + \frac{7}{2}\right]$

Answer: 2

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36. The domain of $\cos^{-1}(4x-9)$ is

A. $(2, 5/2)$

B. $\left[2, \frac{5}{2}\right]$

C. $(9/4, \pi + 9/4)$

D. $[9/4, \pi + 9/4)$

Answer:

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37. The domain of $\sec^{-1}(3x-4)$ is

A. $(1, 5/3)$

B. $[1, 5/3]$

C. $(-\infty, 1) \cup (5/3, \infty)$

D. $(-\infty, 1] \cup [5/3, \infty)$

Answer: A

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38. The domain of $\text{cosec}^{-1}(2x - 11)$ is

A. $(5, 6)$

B. $(-\infty, 5) \cup (11, \infty)$

C. $(-\infty, 5] \cup [6, \infty)$

D. $(-\infty, 6] \cup [11, \infty)$

Answer: 3

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39. The equation $\sin^{-1} x + \cos^{-1} x = \pi/2$ is true for $x \in$

A. $[-1, 1]$

B. $(-1, 1)$

C. $(-\pi/2, \pi/2)$

D. $(0, \pi)$

Answer:

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40. The equation $\tan^{-1} x + \cot^{-1} x = \pi/2$ is true for $x \in$

A. R

B. $R - \{0\}$

C. $(0, \pi/2)$

D. $(0, \pi)$

Answer:

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41. The equation $\sin^{-1} x + \cos^{-1} x = \pi/2$ is true for $x \in$

A. $(1, -1)$

B. $[-1, 1]$

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

D. $(-\infty, -1] \cup [1, \infty)$

Answer:

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42. The domain of $f(x) = \sin^{-1} x + \sec^{-1} x$ is

A. $\{-1, 1\}$

B. $R - [-1, 1]$

C. $[-1, 1]$

D. none

Answer: 1

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43. The domain of $\sin^{-1}\sqrt{x}$ is

A. $[0, 1]$

B. $(0, 1)$

C. R

D. $R - \{0\}$

Answer:

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44. Domain of $\cos^{-1}\sqrt{3x}$ is

A. $\left(-\frac{1}{3}, \frac{1}{3}\right)$

B. $\left[-\frac{1}{3}, \frac{1}{3}\right]$

C. $\left[\left(0, \frac{1}{3}\right]\right.$

D. $\left(0, \frac{1}{3}\right)$

Answer:

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45. The domain of $\log_e \sin^{-1} x$ is

A. $(0, 1]$

B. $(0, 2]$

C. $[5, 11]$

D. $[5, 7]$

Answer: 1

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46. The domain of coth 2x is

A. R

B. $[0, \infty)$

C. $R - \{0\}$

D. $(-1/2, 1/2)$

Answer: 3

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47. The domain of $\cosh^1 3x$ is

A. R

B. $[0, \infty)$

C. $[1/3, \infty)$

D. $(-1/3, 1/3)$

Answer:

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48. The domain of $\tanh^{-1} 5x$ is

A. R

B. $[0, \infty)$

C. $[1/5, \infty)$

D. $(-1/5, 1/5)$

Answer: 4

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49. The domain of $\coth^{-1} 2x$ is

A. $\left(-1/2, \frac{1}{2}\right)$

B. $[-1/2, 1/2]$

C. $(-\infty, -1/2) \cup (1/2, \infty)$

D. $(-\infty, -1/2] \cup [1/2, \infty)$

Answer: 3

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50. The domain of $\text{sech}^{-1} 3x$ is

A. $(0, 1/3)$

B. $(0, \infty)$

C. $(0, 1/3]$

D. $[1/3, \infty)$

Answer:

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51. Domain of $\sin x - e^{\sqrt{x}}$ is

A. R

B. R^n

C. $[0, \infty)$

D. $[-1, 1]$

Answer: 3

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52. The domain of $\frac{2^x + 2^{-x}}{2^x - 2^{-x}}$ is

A. $(-\infty, 2) \cup (2, \infty)$

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

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

D. R

Answer:

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53. The domain of the function $f(x) = \sqrt{x-1} + \sqrt{6-x}$ is

A. $[1, \infty)$

B. $(-\infty, 0)$

C. $[1, 6]$

D. none

Answer:

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54. If $f(x) = 1 + 1/x, g(x) = \sqrt{1 - x^2}$, then the domain of $f(x) - g(x)$ is

A. $[1, 5) \cup (5, 7]$

B. $[-7, 1] \cup (1, 7]$

C. $[-1, 0) \cup (0, 5]$

D. $[-1, 0) \cup (0, 1]$

Answer:

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55. If $f(x) = x^2$ for $x < 0, f(x) = x$ for $0 < x < 1, f(x) = 1/x$ for $x > 1$ then the domain of $f(x) =$

A. $(-\infty, 0) \cup (0, 5) \cup (5, \infty)$

B. $(-\infty, 0) \cup (0, 1) \cup (1, \infty)$

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

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

Answer: 2

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56. If $f(x) = \sqrt{1+x} - 3\sqrt{4-x}$, then $f(x)$ is defined when x lies in

A. $[-2, 2]$

B. $[-5, 5]$

C. $[-1, 5]$

D. $[-1, 5)$

Answer:

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57. Find the domain of the real function $\frac{\sqrt{2+x} + \sqrt{2-x}}{x}$

A. $[-2, 2]$

B. $(-2, 2)$

C. $[-2, 0) \cup (0, 2]$

D. $R - \{0\}$

Answer:

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58. The domain of $\left(\sqrt{3+x} + \sqrt{3-x}\right)$ is

A. $[-3, 3]$

B. $(-3, 0) \cup (0, 3)$

C. $[-3, 0) \cup (0, 3]$

D. R

Answer:

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59. Domain of $\frac{\log(x-2)}{\sqrt{3-x}}$ is

A. $(2, 3)$

B. $[2, 3)$

C. $(2, \infty)$

D. $(-\infty, 3)$

Answer:

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60. If $f(x) = \log(\cos x)$, then domain $f =$

A. $\{x : 2n\pi - \pi/2 < x < 2n\pi + \pi/2, n \in Z\}$

B. $\{x : 2n\pi < x < (2n\pi + 1)\pi n \in Z\}$

C. $\{x : x \in (-\infty, \infty)\}$

D. none

Answer:

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61. If $f(x) = \log(\sin x)$, then domain $f =$

A. $\{x : 2n\pi - \pi/2 < x < 2n\pi + \pi/2, n \in Z\}$

B. $\{x : 2n\pi < x < 2n\pi + \pi, n \in Z\}$

C. $\{x : 2n\pi < x < 2n\pi + 3\pi/2, n \in Z\}$

D. R

Answer:

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62. The largest interval lying in $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ for which the function $f(x) = 4^{-x^2} + \cos^{-1}\left(\frac{x}{2} - 1\right) + \log(\cos x)$ is defined, is

A. $[0, \pi]$

B. $(-\pi/2, \pi/2)$

C. $[-\pi/4, \pi/2)$

D. $[0, \pi/2)$

Answer:

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63. The domain of $\log\left[\frac{\left(\sqrt{4-x}^2\right)}{1-x}\right]$ is

A. $(-1, 1)$

B. $(-2, 1)$

C. $(-2, -1)$

D. $(1, 2)$

Answer:

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64. The domain of $\sin^{-1}\left[\log_2\left(x^2/2\right)\right]$ is

A. $[-2, -1]$

B. $[1, 2]$

C. $[-2, -1] \cup [1, 2]$

D. $(0, \infty)$

Answer: 3

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65. Let $f: R \to [0, \pi/2)$ defined by $f(x) = \tan^{-1}(x^2 + x + a)$, then the set of value of a for which f is onto is

A. $[0, \infty]$

B. $[2, 1]$

C. $\left[\frac{1}{4}, \infty\right)$

D. none

Answer: 3

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66. The domain of $f(x) = \tan^{-1}\sqrt{x(x+3)} + \sin^{-1}\sqrt{x^2 + 3x + 1}$ is

A. $(-3, 1)$

B. $(3, 0)$

C. $\{-3, 0\}$

D. $\{0, 3\}$

Answer: 3

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67. The domain of the function $\sqrt{\frac{1}{|\cos x|}}$ is

A. $R - \{\pi/2\}$

B. $R - \{\pi/2, 3\pi/2\}$

C. $R - \left\{(2n+1)\frac{\pi}{2} : n \in Z\right\}$

D. $R - \{n\pi : n \in Z\}$

Answer: 3

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68. The domain of $f(x) = \cot^{-1}\left(\frac{x}{\sqrt{x^2 - [x^2]}}\right)$ is

A. R

B. $R - \{0\}$

C. $R - \{\sqrt{x}, x \in Z, x \geq 0\}$

D. none

Answer: 3

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69. The domain of the function $f(x) = \sqrt{\sec^{-1}\left(\frac{1-|x|}{2}\right)}$ is

A. $[-\infty, -3)$

B. $[3, \infty)$

C. $(-\infty, -3] \cup [3, \infty)$

D. none

Answer: 3

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70. The domain of $f(x) = \left(\frac{\sec^{-1}(x)}{\sqrt{x - [x]}}\right)$ is

A. R

B. $R^+ - (0, 1)$

C. $R - \{(-1, 1) \cup Z\}$

D. $R^+ - Z$

Answer:

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71. The domain of $x^{\frac{1}{\log x}}$ is

A. $(0, \infty)$

B. $(1, \infty)$

C. $(0, 1) \cup (1, \infty)$

D. $[1, \infty)$

Answer:

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72. The domain of $|x-2|-|x-5|$ is

A. $R-\{2,5\}$

B. $R-\{0\}$

C. $(0,\infty)$

D. (∞,∞)

Answer:

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73. The domain of $f(x)=\sqrt{1-3x}+5\sin^{-1}.\dfrac{2x-1}{3}$ is

A. $[-1,1/3]$

B. $(-1, 1/3)$

C. $[-1, 1/3)$

D. $(-1, 1/3]$

Answer:

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74. The doamin of $\sqrt{1-3x} + \cos^{-1}.\ \frac{3x-1}{2}$ is

A. $(-1/3, 1/3)$

B. $[-1/3, 1/3]$

C. $(-\infty, 1/3]$

D. $[-1/3, 1]$

Answer:

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75. The domain of $\cos^{-1}(2x-3)+\sqrt{9-4x^2}$ is

A. $\left[-1/3, \frac{1}{2}\right]$

B. $[-1/3, 0]$

C. $[1, 3/2]$

D. $[1/2, 1]$

Answer:

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76. The domain of the function $f(x)=\frac{\sin^{-1}(x-3)}{\sqrt{9-x^2}}$, is

A. $[2, 3]$

B. $[1, 2)$

C. $[1, 2]$

D. $[2, 3)$

Answer:

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77. If $[x]$ denotes the integral part of x, then domain of the function $f(x) = \frac{\sqrt{3-x}}{(x-1)(x-2)(x-3)} + \sin^{-1}\left(\frac{3x-2}{2}\right)$

A. $[0, 1) \cup (1, 4/3]$

B. $\{0, 2\}$

C. $\{-1, 0, 1\}$

D. $[-1, 2]$

Answer: 1

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78. The domain of $f(x) = \sqrt{x+1} + \frac{1}{\log_{10}(2-x)}$ is

A. $[-1, 2]$

B. $(-1, 2)$

C. $[-1, 1) \cup (1, 2)$

D. R

Answer:

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79. The domain of $f(x) = \frac{3}{4 - x^2} + \log_{10}(x^3 - x)$ is

A. $(1, 2)$

B. $(-1, 0) \cup (1, 2)$

C. $(1, 2) \cup (2, \infty)$

D. $(-1, 0) \cup (1, 2) \cup (2, \infty)$

Answer:

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80. The domain of $\sqrt{\cos(\sin x)} + \sin^{-1}\left(\frac{1+x^2}{2x}\right)$ is

A. $(-1, 1)$

B. $\{-1, 1\}$

C. $[0, 1]$

D. $(0, 1)$

Answer:

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81. The domain of $f(x) = \sin^{-1}\left(\frac{1+x^2}{2x}\right) + \sqrt{1-x^2}$ is

A. $\{1\}$

B. $(-1, 1)$

C. $\{1, -1\}$

D. {0}

Answer:

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82. The domain of the function $f(x) = \sqrt{4 - x^2}$

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83. $\sqrt{\sin x} + \sqrt{16 - x^2}$ defined on

A. $(\pi, 4)$

B. $[-4, -\pi]$

C. $[-\pi, \pi]$

D. $[-4, 4]$

Answer:

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84. The domain of $\frac{1}{\sqrt{x-x^2}}+\sqrt{3x-1-2x^2}$ is

A. $[1/2, 1]$

B. $[1/2, 1)$

C. $(1/2, 1]$

D. $(1/2, 1)$

Answer:

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85. The domain of $\frac{\sqrt{x-3}}{x+3}+\frac{\sqrt{2-x}}{2+x}$ is

A. $(-\infty, -2) \cup (3, \infty)$

B. $(2, 3)$

C. R

D. $\varnothing$

Answer: D

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86. The domain of $\cos^{-1}.\frac{x-3}{2} - \log_{10(4-x)}$ is

A. $(1, 4)$

B. $[1, 4)$

C. $(1, 4]$

D. $[1, 4]$

Answer:

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87. The domain of $f(x) = \log_{10}\left(\sqrt{x-4} + \sqrt{6-x}\right)$ is

A. $[4, 6]$

B. $(-\infty, 6)$

C. $(2, 3)$

D. none

Answer:

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88. The domain of $f(x) = .^{(9-x)} P_{x-4}$ is

A. $[4, 9]$

B. $\{4, 5, 6\}$

C. $\{4, 5, 6, 7, 8, 9\}$

D. $\{4, 5\}$

Answer:

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89. If the function $y = f(x)$ is defined by $2^x + 2^y = 2$ then the domain of $f(x)$ is

A. $(0, 1]$

B. $[0, 1]$

C. $(-\infty, 1)$

D. $(-\infty, 0]$

Answer:

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90. The function tranforms x into y. If $y = \sqrt{2x + 1}$ and range of $yis\{y : 0 < y < 5\}$, then domain =

A. $\{x : -1/2 < x < 1/2\}$

B. $\{x : 1 < \ < x < 12\}$

C. $\{x : 0 < x < 10\}$

D. none

Answer: 1

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91. If A is the set of all x such that $\frac{2x+1}{2x^3+3x^2+x} > 0$ then A contains

A. $(-\infty, -3/2)$

B. $(-3/2, -1/4)$

C. $(-1/4, 1/2)$

D. $(-1/2, \infty)$

Answer:

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92. The maximum possible domain and corresponding range for $f(x) = (-1)^x$ are

A. $D_f = R, R_f = [-1, 1]$

B. $D_f = Z, R_f = \{1, -1]$

C. $D_f = Z, R_f = [1, 1]$

D. $D_f = R, R_f = \{-1, 1\}$

Answer:

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93. Let $A = \{x \in R : x \neq 0, -4 \leq x \leq 4\}$ and $f : A \to R$ is defined by $f(x) = \frac{|x|}{x}$ for $x \in A$. Then the range of f is

A. $\{1, -1\}$

B. $\{x : 0 \leq x \leq 4\}$

C. $\{1\}$

D. $\{x: -4, \leq x \leq 0\}$

Answer:

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94. Find the domain and range of the real valued function $f(x) = \frac{2+x}{2-x}$

A. R

B. $R - \{-1\}$

C. $R - \{1\}$

D. $R - \{2\}$

Answer:

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95. If $f:[2,3] \to \mathbb{R}$ is defined by $f(x) = x^3 + 3x - 2$, then the range $f(x)$ is contained in the interval :

A. $[1, 12]$

B. $[12, 34]$

C. $[35, 50]$

D. $[-12, 12]$

Answer:

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96. The range of $f(x) = 5\cos x - 12\sin x + 7$ is

A. $[-6, 20]$

B. $[-7, 21]$

C. $[-2, 29]$

D. none

Answer:

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97. If $f: R \to S$, defined by $f(x) = \sin x - \sqrt{3}\cos x + 1$, is onto, then the interval of S is

A. $[0, 3]$

B. $[-1, 3]$

C. $[0, 1]$

D. $[-1, 1]$

Answer:

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98. If $A = \cos^3\theta$, for all real value of θ, then

A. $-1 \leq A \leq 1$

B. $-1/4 \leq A \leq 1/4$

C. $-3/4 \leq A \leq 3/4$

D. none

Answer: 1

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99. The range of $\sin^2 x + \cos^4 x$ is

A. $[3/4, 1]$

B. $[0, 1]$

C. $[0, 3/4]$

D. none

Answer:

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100. The function $f: R \to R$ defined by $f(x) = \cos^2 x + \sin^4 x$ for $x \in R$. Then $f(R) =$

A. $(3/4, 1)$

B. $[3/4, 1)$

C. $[3/4, 1]$

D. $(3/4, 1)$

Answer: 3

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101. The range of $\sec^2 x + 4\,\text{cosec}^2 x$ is

A. $[1, 5]$

B. $[5, \infty]$

C. $[9, \infty)$

D. $[4, 9]$

Answer: 3

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102. The range of $5\cos^{-1}(3x)$ is

A. $[0, 5\pi]$

B. $[-3, 3]$

C. $[-1, 1]$

D. $[0, \pi]$

Answer: 1

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103. The domain of $f(x) = \tan^{-1} 5x$ is

A. $-\infty, \infty$

B. $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

C. $(0, \infty)$

D. $-\infty, 0$

Answer:

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104. The range of $\sin^{-1} x + \cos^{-1} x$ is

A. R

B. $[-1, 1]$

C. $[0, \pi/2]$

D. $\{\pi/2\}$

Answer:

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105. The range of $\sin^{-1} x - \cos^{-1} x$ is

A. $\left[\frac{-3\pi}{2}, \frac{\pi}{2}\right]$

B. $\left[\frac{-5\pi}{2}, \frac{\pi}{3}\right]$

C. $\left[\frac{-3\pi}{2}, \pi\right]$

D. $\left[0, \frac{\pi}{2}\right]$

Answer:

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106. Range of $\sin^{-1} x + \cos^{-1} x + \tan^{-1} x$ is

A. $(0, \pi)$

B. $\left[\frac{\pi}{4}, \frac{3\pi}{4}\right]$

C. $\left[\frac{-\pi}{4}, \frac{\pi}{4}\right]$

D. $\left[0, \frac{3\pi}{4}\right]$

Answer:

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107. The range of $\cot^{-1}(-x) - \tan^{-1} x + \sec^{-1}$ is

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108. If $f: A \to R$ is defined by $f(x) = \cos x - x(1+x)$ and $A = \left\{x: \frac{\pi}{6} \leq x \leq \frac{\pi}{3}\right\}$ then range of f is

A. $\left[\frac{1}{2} - \frac{\pi}{3}, 1 + \frac{\pi}{3}\right]$

B. $\left[\frac{1}{2} + \frac{\pi}{6} + \frac{\pi^2}{36}, \frac{3}{2} + \frac{\pi}{3}\right]$

C. $\left[\frac{1}{2} - \frac{\pi}{3} - \frac{\pi^2}{9}, \frac{\sqrt{3}}{2} - \frac{\pi}{6} - \frac{\pi^2}{36}\right]$

D. $\left[\frac{\pi^2}{2}, \frac{\pi}{2}\right]$

Answer:

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109. Find the range of the real function $\frac{x^2-4}{x-2}$

A. R

B. $R-\{2\}$

C. $R-\{\pm 2\}$

D. $R-\{4\}$

Answer:

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110. The range of $\frac{1}{5-\sin 2x}$ is

A. $[1/6, 1/4)$

B. $(1/6, 1/4]$

C. $(1/6, 1/4)$

D. $[1/6, 1/4]$

Answer: 4

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111. If $f: R \to R$ is defined by $f(x) = \frac{1}{2 - \cos 3x}$ for each $x \in R$ then the range of f is

A. $(1/3, 1)$

B. $[1/3, 1]$

C. $(1, 2)$

D. $[1, 2]$

Answer: 2

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112. The range of $\frac{1-\tan x}{1+\tan x}$ is

A. $R-\{-1\}$

B. $R-\{0\}$

C. $(-\infty, 0)$

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

Answer: D

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113. If

$f(x)=-x \quad \text{for} \quad x<0, f(x)=x \quad \text{for} \quad 0 \leq x \leq 1, f(x)=1/x \quad \text{for} \quad x>$

then the range of f is

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

B. $(1, \infty)$

C. $[0, \infty)$

D. R

Answer: 3

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114. If $f(x) = x^2, \quad \text{for} \quad x \geq 0$

$= 2x - 5, \quad \text{for} \quad x < 0$ then range of $f(x) =$

A. $(-\infty, -5) \cup [0, \infty)$

B. $(-\infty, 5) \cup (0, 1)$

C. $(0, 5) \cup (1, \infty)$

D. none

Answer: 1

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115. The range of the function $f(x) = .^{7-s} P_{x-3}$ is

A. $\{1, 2, 3\}$

B. $\{1, 2, 3, 4, 5\}$

C. $\{1, 2, 3, 4\}$

D. $\{1, 2, 3, 4, 5, 6\}$

Answer:

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116. The range of $|x - 3|$ is

A. $(0, \infty)$

B. $[0, \infty)$

C. R

D. $R - \{3\}$

Answer:

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117. The range of $\sqrt{|x| - x}$ is

A. $(0, \infty)$

B. $[0, \infty)$

C. $(-\infty, 0)$

D. $(-\infty, 0]$

Answer:

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118. The domain of $\sqrt{x - 5}$ is

A. $(0, \infty)$

B. $[5, \infty)$

C. R

D. $R - \{5\}$

Answer:

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119. The domain of $|x - 2| + |x - 5|$ is

A. $[2, 5)$

B. R

C. $R - \{2, 5\}$

D. $[2, 5]$

Answer:

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120. The range of $f(x) = 10 - |3 - 2x|$ is

A. $(10, \infty)$

B. $[10, \infty)$

C. $(-\infty, 10)$

D. $(-\infty, 10]$

Answer:

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121. Find the range of $\log|4 - x^2|$

A. R

B. $R - \{\pm 2\}$

C. $R - \{0\}$

D. $(-2, 2)$

Answer:

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122. Range of $[\sin x]$ is .....

A. $[-1, 1]$

B. $\{-1, 1\}$

C. $\{-1, 0, 1\}$

D. $(0, 1)$

Answer: 3

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123. The range of the function $f(x) = [\sin x + \cos x]$ (where $[x]$ denotes the greatest integer function) is

A. $[-2, 1]$

B. $\{-2, -1, 0, 1\}$

C. $\{-1, 1\}$

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

Answer:

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124. The range of the function $f(x) = \cos[x]$ where $-\frac{\pi}{2} < x < \frac{\pi}{2}$ is

A. $\{-11, 0\}$

B. $\{1, \cos 1, \cos 2\}$

C. $\{\cos 1, -\cos 1, 1\}$

D. none

Answer:

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125. If $f: R \to R$ is defined by $f(x) = [2x] - 2[x]$ for $x \in R$, where [x] is the greatest integer not exceeding x, then the range of f is

A. $\{x \in \mathbb{R}: 0 \leq x \leq 1\}$

B. $\{0, 1\}$

C. $\{x \in \mathbb{R}: x > 0\}$

D. $\{x \in \mathbb{R}: x < 0\}$

Answer:

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126. The range of $f(x) = \dfrac{\sin \pi \left[x^2 - 1\right]}{x^4 + 1}$ is

A. R

B. $[-1, 1]$

C. $\{0, 1\}$

D. $\{0\}$

Answer:

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127. The range of $\frac{x^2}{1+x^2}$ is

A. $(0, 1)$

B. $[0, 1)$

C. $(0, \infty)$

D. $[0, \infty)$

Answer:

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128. The range of $\frac{1}{1+x^2}$ is

A. $(0, 1]$

B. $(0, 2]$

C. $[1, 5]$

D. $(1, 5)$

Answer:

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129. The range of the function $f(x) = \frac{x^2}{x^4 + 1}$ is

A. $(0, 1/2)$

B. $[1, 1/2)$

C. $[0, \infty)$

D. $[0, 2]$

Answer:

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130. If $y = \dfrac{x^2 + 2x + 1}{x^2 + 2x + 7}$, then inverse function x is difined only when

A. $0 < y < 1$

B. $0 < y \leq 1$

C. $0 \leq y < 1$

D. $0 \leq y \leq 1$

Answer: 3

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131. The range of $\dfrac{x^2 - x + 1}{x^2 + x + 1}$ is

A. $\left[\dfrac{1}{3}, 3\right]$

B. $\left[\dfrac{1}{3}, 1\right]$

C. $[1, 3]$

D. $\left(-\infty, \frac{1}{3}\right] \cup [3, \infty)$

Answer:

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132. The range of values of x for which, $x^2 + 6x - 27 > 0, \ -x^2 + 3x + 4 > 0$ hold simultaneously is

A. $(1, 5)$

B. $(5, 2)$

C. $(3, 4)$

D. $(5, 7)$

Answer: 3

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133. If $a^2 + b^2 + c^2 = 1$, then the range of $ab + bc + ca$ is

A. $[-1/2, 1]$

B. $[-1/2, \infty)$

C. $[1, \infty)$

D. none

Answer:

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134. If $a^2 + b^2 + c^2 = 2$ then the range of $ab + bc + ca$ is

A. $[-1/2, 1]$

B. $[-1/2, \infty)$

C. $[-1, 2]$

D. $[1, \infty)$

Answer:

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135. If α, β, γ are the angles made by a line with the positive directions of the coordinate axes, then $\sin^2\alpha + \sin^2\beta + \sin^2\gamma =$

A. $[-1/2, 1]$

B. $[-1/2, \infty)$

C. $[-1, 2]$

D. $[1, \infty)$

Answer:

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136. If a line makes angles α, β, γ with positive axes, then the range of $\sin\alpha\sin\beta + \sin\beta\sin\gamma + \sin\gamma\sin\alpha$ is

A. $[-1/2, 1]$

B. $[-1, 2]$

C. $[-1/2, \infty)$

D. $[-1, \infty)$

Answer:

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137. If a,b,c are the sides of a triangle then the range of $\frac{ab+bc+ca}{a^2+b^2+c^2}$ is

A. $[1, 2)$

B. $[1/2, 1]$

C. $[1/2, 2)$

D. $(-1/2, 2)$

Answer: 2

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138. The range of $x^2 + 4y^2 + 9z^2 - 6yz - 3xz - 2xy$ is

A. $\varnothing$

B. R

C. $[0, \infty)$

D. $(-\infty, 0)$

Answer:

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Exercise 2 Special Type Questions

1. I : Ever function must be either even or odd function

The function $f(x) = \log\left(x + \sqrt{x^2 + 1}\right)$ is an odd function.

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

Answer:

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2. I : Every strictlyy monotonic function is one one.

II : The function $f: R^+ \to R$ defined by $f(x) = 5 + x^2$ is one one .

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

Answer:

Watch Video Solution

3. If $f(x)$ and $g(x)$ are two functions such that $f(x)+g(x)=e^{x}$ and $f(x)-g(x)=e^{-x}$ then

I: f(x) is an even function

II : g(x) is an odd function

III : Both f(x) and g(x) are neigher even nor odd.

A. I and II are true

B. only I is true

C. only II is true

D. only III is true

Answer:

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4. Let $f(x)=\sec^{-1}\left[1+\cos^{2}x\right]$ where $[.]$ denotes the greatest integer function

I : Domain of $f(x)$ is R

II : Range of f(x) is $\left\{\sec^{-1} 1, \sec^{-1} 2\right\}$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

Answer:

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5. Statement I : The range of the function $f(x) = \dfrac{\sin([x]\pi)}{x^2 + x + 1}$ is {0}

Statement II : The range of the function $f(x) = \dfrac{x - [x]}{1 + x - [x]}$ is [0, 1/2)`.

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

Answer:

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6. I : The range of the function $f(x) = \cos[x] \quad \text{for} \quad -\pi/2 < x < \pi/2$ is $\{1, \cos 1, \cos 2\}$.

II. Every periodic function is one one.

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

Answer: 1

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7. The function $f: R \to R$ is defined by $f(x) = 3^{-x}$. Observe the following statements

I. f is one - one

II. f is onto

III. F is a decreasing function

Out of these, true statements are :

A. only I, II

B. only II, III

C. only I, III

D. I, II, II

Answer:

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