doubtnut
India's Number 1 Education App

MATHS

BOOKS - MARVEL MATHS (HINGLISH)

CONTINUITY F FUNCTIONS

Multiple Choice Questions

1. tan x is discontinuous at x = ...

A. π

B. 0

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

D. $-\pi$

Answer: C

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2. At x = 0 $f(x) \begin{matrix} = \csc x & \text{if} \quad x \neq 0 \\ = 1 & \text{if} \quad x = 0 \end{matrix}$ is

A. continuous

B. discontinuous

C. not defined

D. increasing

Answer: b

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3. Value of $f(0)$ so that $f(x) = \dfrac{\sqrt{2+x} - \sqrt{2}}{x}$ is continuous at $x = 0$ is

A. $\sqrt{2}$

B. 2

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

D. 0

Answer: C

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4. Value of $f(-2)$ so that f(x)= $\frac{x^3+8}{x+2}$ is continuous at x $=-2$ is

A. -12

B. 2

C. 8

D. 12

Answer: D

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5. Value of $f(-2)$, if f(x) = $\frac{x^3+8}{x^5+32}$ is continuous at x = -2 is

A. $-\frac{3}{20}$

B. $\frac{3}{20}$

C. $\frac{20}{3}$

D. $-\frac{20}{3}$

Answer: B

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6. At $x = 3$, $f(x) = \begin{cases} x^5 - 243, & \text{if } x \neq 3 \\ x^3 - 27, & \text{if } x = 3 \end{cases}$ is

A. continuous

B. discontinuous

C. undefined

D. removeably discontinuous

Answer: a

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7. $f(x) = \frac{x \sin 6x}{\tan 5x \tan 7x}$ for $x \neq 0$, is continuous at x = 0 if f(0) $= \ldots$.

A. $\frac{35}{6}$

B. $\frac{35}{6}$

C. $-\frac{6}{35}$

D. $\frac{6}{35}$

Answer: D

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8. The value of f(0), if f(x) $= \frac{x \tan 2x}{\sin 3x \sin 5x}$ is continuous at x = 0 is

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

B. $\frac{2}{5}$

C. $\frac{2}{15}$

D. $\frac{15}{2}$

Answer: c

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9. If the function f(x) $\frac{3\sin x - \sin 3x}{x^3}, x \neq 0$, is continuous at the point x = 0 , then : f(0) =

A. -4

B. 4

C. 0

D. 6

Answer: b

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10. If f(x) = $\frac{x - \sin x}{x}$ for $x \neq 0$, and f(x) = k , for x = 0 is continuous at x = 0 ,then k = ...

A. -1

B. 0

C. 1

D. 2

Answer: b

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11. Value of f(0) so that f(x) = $\frac{\cos 2x - 1}{\sqrt{x^2 + 1} - 1}$ is continuous at x = 0 is

A. 4

B. -4

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

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

Answer: b

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

$$\left.\begin{array}{ll} f(x)=\frac{1-\cos kx}{x\sin x}, & \text{for} x\neq 0 \\ =9, & \text{for} x=0 \end{array}\right\} atx=0.$$

A. -2

B. -3

C. 0

D. ± 1

Answer: d

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13. Value of f(0) so that f(x) = $\left[\frac{(1+x)^5}{(1+2x)}\right]^{1/x}$ is continuous at x = 0 is

A. e^5

B. e^2

C. e^3

D. e

Answer: c

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14. Value of f(0) so that f(x) = $\frac{\log(1+bx)-\log(1-ax)}{x}$ is continuous at x = 0 is

A. $b-a$

B. $a+b$

C. $a-b$

D. $\log(ab)$

Answer: b

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15. Value of f(0) so that f(x) = $\frac{a^x - 1}{1 - b^x}$ is continuous at x = 0 is

A. $\log_b a$

B. $\log_a b$

C. $-\log_b a$

D. $-\log_a b$

Answer: c

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16. If f(x) = $\frac{a^{mx} - 1}{\sin mx}$ is continuous at x = 0 , then m is

A. any real no

B. any non-zero real no

C. 0

D. imaginary

Answer: b

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17. If f(x) $= \frac{(e^{mx}-1)\sin mx}{4x^2}$, $x \neq 0$ and f(0) = 9 ,is continuous at x = 0 , then m $= \ldots.$

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

B. ± 3

C. ± 4

D. ± 6

Answer: d

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18. If $f(x) \begin{matrix} = 4(3^x), & \text{if } x < 0 \\ = x + 2k + 2 & \text{if } x \geq 0 \end{matrix}$ is continuous at x = 0 , then $k = \ldots.$

A. -1

B. 0

C. 1

D. 2

Answer: c

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19. Value of f(2) so that f(x) = $\frac{3^{x+2} - 81}{9^x - 9^2}$ is continuous at x = 2 is

A. 2

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

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

D. -2

Answer: B

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20. $f(x) = \frac{x\cos x + 3\tan x}{x^2 + \sin x}$ if $x \neq 0$; $= 4$ if $x = 0$ at x = 0 ,is

A. undefined

B. continuous

C. discontinuous

D. decreasing

Answer: b

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21. $f(x) = \begin{matrix} \frac{\tan(x^2 - x)}{x} & \text{if} \quad x \neq 0 \\ = 2 & \text{if} \quad x = 0 \end{matrix}$ at x=0, is

A. not real

B. continuous

C. discontinuous

D. increasing

Answer: c

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22. $f(x) \begin{matrix} \frac{e^{5x} - e^{3x}}{\sin 2x}, & \text{if} \quad x \neq 0 \\ = 1, & \text{if} \quad x = 0 \end{matrix}$ at x = 0 is ,

A. continuous

B. discontinuous

C. unreal

D. not defined

Answer: a

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23. If f(x) $= \frac{(2^x-1)^2}{\sin x . \log(1+x)}, \quad \text{if} \quad x \neq 0$
$= 2\log 2, \quad \text{if} \quad x = 0$ then , at x = 0 the function f is

A. continuous

B. discontinuous

C. not defined

D. imaginary

Answer: b

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24. $f(x) = \begin{cases} \frac{5^{\cos x}-1}{\frac{\pi}{2}-x}, & x \neq \frac{\pi}{2} \\ \log 5, & x = \frac{\pi}{2} \end{cases}$ at $x = \frac{\pi}{2}$ is

A. discontinuous

B. imaginary

C. continuous

D. not defined

Answer: c

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25. If $f(x) = \frac{\sin[4(x-3)]}{x^2-9}, x \neq 3,$ is continuous at x = 3 then f(3) = ...

A. 1

B. 2

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

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

Answer: c

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26. $f(x) = \left.\begin{array}{ll} \frac{\sqrt{x+3}-2}{x^3-1}, & \text{if} \quad x \neq 1 \\ = \frac{1}{12}, & \text{if} \quad x = 1 \end{array}\right\}$ at x = 1 , si

A. continuous

B. discontinuous

C. 0

D. not defined

Answer: a

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

A. -4

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

C. -2

D. 1.3

Answer: c

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28. If $f(x) = \frac{x^2 - 4x + 3}{3x^2 - 10x + 3}, x \neq 3$ is continuous at x = 3 , then f(3) = ...

A. -4

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

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

D. 4

Answer: b

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29. Function $f(x) = \sqrt{9 - x^2}$ is continuous in

A. $[-3, 0]$

B. $[0, 3]$

C. $[3, \infty]$

D. $[-3, 3]$

Answer: d

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30. Function f(x) = $\frac{x - 2}{x^2 - 5x + 6}$ is discontinuous at x = ...

A. $-2, \ -3$

B. $2, 3$

C. $-2, 3$

D. $2, \ -3$

Answer: b

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31. Function $f(x) = \frac{1}{2x^2 + x + 1}$ is

A. continuous on R

B. discontinuous on R

C. continuous on R - {0}

D. continuous on R - {1}

Answer: a

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

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

B. $1, 2$

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

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

Answer: d

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33. If $f(x) \begin{matrix} = (1+kx)^{1/x}, & \text{if} & x \neq 0 \\ = e^4, & \text{if} & x = 0 \end{matrix}$ is continuous at x = 0 , then k = ...

A. 3

B. 4

C. 5

D. -4

Answer: b

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34. If $f(x) = \begin{matrix} \frac{8^x - 2^x}{k^x - 1}, & \text{if} & x \neq 0 \\ = 2, & \text{if} & x = 0 \end{matrix}$ is continuous at x = 0, then k = ...

A. ± 2

B. -2

C. 2

D. 4

Answer: c

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

A. 2 log 7

B. $2\log\left(\frac{10}{7}\right)$

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

D. log 70

Answer: c

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36. If $f(x) = \begin{matrix} a^2\sin^2 x + e^2\cos^2 x, & \text{if} \quad x \leq 0 \\ = e^{ax+b}, & \text{if} \quad x > 0 \end{matrix}$ is continuous at x = 0 , then b = ...

A. 2

B. $\log|a|$

C. 2 log |a|

D. 1

Answer: a

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37. Value of a so that $f(x) = \frac{\sin^2 ax}{x^2}, x \neq 0$ and f(0) = 1 is continuous at x = 0 is

A. 0

B. 1

C. -1

D. ± 1

Answer: d

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38. Value of f(0) so that f(x) $= \frac{\sin\left(x^2 + 4x\right) - \sin 4x}{x \tan x} x \neq 0$, is continuous at x = 0 is

A. -4

B. 1

C. 2

D. -2

Answer: b

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39. At x = 0 , $f(x)$ $\left.\begin{array}{lll} = x-2, & \text{if} & x<0 \\ = 1/2, & \text{if} & x=0 \\ = x^2, & \text{if} & x>0 \end{array}\right\}$ is

A. continuous

B. discontinuous

C. not defined

D. undefined

Answer: b

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40. If f(x) $= -x^2, \quad$ if $x \leq 0$
$= 5x - 4, \quad$ if $0 < x \leq 1$ then f is
$= 4x^2 - 3x, \quad$ if $1 < x \leq 2$

A. continuous at x = 0,1

B. discontinuous at x = 0,1

C. continuous at x =1 , discontinuous at x = 3

D. discontinuous at x = 0 , continuous at x = 1

Answer: d

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41. Function $f(x) = \begin{cases} 2x - 1, & \text{if } x \leq 1 \\ x^2, & \text{if } 1 < x \\ 3x - 4, & \text{if } 2 < x < 4 \end{cases}$ is continuous on

A. R

B. $(-\infty, 2)$

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

D. $R - \{2\}$

Answer: c

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42. If f(x) $\begin{matrix} = x^2 - 1, & \text{if} & x < 3 \\ = 2ax, & \text{if} & x \leq 3 \end{matrix}$ is continuous at x = 3 , then a = ...

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

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

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

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

Answer: a

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43. If f(x) $\begin{matrix} = x^3, & \text{if} & x < 1/2 \\ = ax^2, & \text{if} & x \geq 1/2 \end{matrix}$ is continuous at x=1/2 , then a = ...

A. 1

B. 2

C. $1/2$

D. 3

Answer: c

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44. If f(x) $\begin{matrix} = x+1, & \text{if } x \leq 1 \\ = 3+ax^2, & \text{if } x > 1 \end{matrix}$ is continuous on R , then a = ...

A. 1

B. 0

C. -1

D. $\sqrt{3}$

Answer: c

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45. If $f(x) = \begin{cases} \frac{\sqrt{1+px}-\sqrt{1-px}}{x}, & -1 \leq x < 0 \\ \frac{2x+1}{x-2}, & 0 \leq x \leq 1 \end{cases}$ is continuous in [-1,1] then p is equal to

A. 0

B. -1

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

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

Answer: d

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46. If f(x) $= 3k, \quad$ if $\quad x \leq \frac{1}{2}$
$= \frac{3}{2} - 2x \quad ,$ if $\quad \frac{1}{2} < x < 1$
is continuous at x = $\frac{1}{2}$, then $k = \ldots\ldots$

A. 6

B. -6

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

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

Answer: c

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47. If f(x) $\begin{matrix} = 3x - 4, & \text{if } 0 \leq x \leq 2 \\ = 2x + k, & \text{if } 2 < x \leq 3 \end{matrix}$ is continuous x = 2 , then k = ...

A. -1

B. -2

C. -3

D. -4

Answer: b

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48. Let $f(x) = \begin{cases} -2\sin x & \text{for} \quad -\pi \leq x \leq -\frac{\pi}{2} \\ a\sin x + b & \text{for} \quad -\frac{\pi}{2} < x < \frac{\pi}{2} \\ \cos x & \text{for} \quad \frac{\pi}{2} \leq x \leq \pi \end{cases}$. If f is continuous on $[-\pi, \pi)$, then find the values of a and b.

A. $(-1, 1)$

B. $(0, 1)$

C. $(1, 0)$

D. $(1, -1)$

Answer: a

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49. Given f(x) $\begin{matrix} = x^2 + a, & \text{if} \quad x \leq 0 \\ = 2\sqrt{1+x^2} + b, & \text{if} \quad x > 0 \end{matrix}$ and $f(-1) = 2$. If f is continuous at x = 0, then (a,b) $\equiv \ldots\ldots$

A. $(-1, 1)$

B. $(0, 1)$

C. $(1, 0)$

D. $(1, -1)$

Answer: d

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50. If f(x) $\begin{matrix} = \frac{\sin 4x}{5x} + a, & \text{if} \quad x > 0 \\ = x + 4 - b, & \text{if} \quad x \leq 0 \end{matrix}$ is continuous at x= 0 , then $a + b - = \ldots\ldots$

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

B. 3

C. $-\frac{14}{5}$

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

Answer: d

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51. If f(x) $= x + a, \quad \text{if} \quad x < 0$
$= x, \quad \text{if} \quad 0 \leq x \leq 1$ is continuous in $[-2, 2]$, then
$= b - x, \quad \text{if} \quad x > 1$

$a + b$ is

A. imaginary

B. odd

C. even

D. zero

Answer: c

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52. If f(x) $= x^2 + ax + b, \quad \text{if} \quad 0 \leq x < 2$
$= 3x + 2, \quad \text{if} \quad 2 \leq x \leq 4$ is continuous on $[0, 8]$ then
$= 2ax + 5b, \quad \text{if} \quad 4 < x \leq 8$

$a - b = \ldots\ldots$

A. 1

B. 2

C. 3

D. 5

Answer: d

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53. If f(x) $= \frac{x^2}{a}, \quad \text{if } 0 \leq x < 1$

$= a, \quad \text{if } 1 \leq x < \sqrt{2}$

$= \frac{2b^2 - 4b}{x^2}, \quad \text{if } \sqrt{2} \leq x$

is continuous in $(0, \infty)$, then the most suitable values of a and b (in that order) are

A. $1, -1$

B. $-1, 1 + \sqrt{2}$

C. $-1, 1$

D. $-1, -1$

Answer: c

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54. If x = a, f(x) $\left.\begin{array}{lll} = \frac{x^2}{a} - a, & \text{if} & 0 < x < a \\ = 0, & \text{if} & x = a \\ = a - \frac{a^3}{x^2}, & \text{if} & x > a \end{array}\right\}$ is

A. continuous

B. discontinuous

C. only left- continuous

D. only right continuous

Answer: a

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55. If f(x) $\begin{array}{lll} = \frac{x^3 + x^2 - 16x + 20}{(x-2)^2}, & \text{if} & x \neq 2 \\ = k, & \text{if} & x = 2 \end{array}$ is continuous at x = 2 , then

A. $k = 2$

B. $k = 0$

C. $k = 20$

D. $k = 7$

Answer: d

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56. If f(x) $= 2x - 1, \text{ if } x > 2$
$= 2k, \text{ if } x = 2$
$= x^2 - 1, \text{ if } x < 2$ is continuous on R , then k = ...

A. 3

B. -3

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

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

Answer: c

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57. If f(x) $\frac{2^{x+2}-16}{4^x-2^4}, x \neq 2$ is continuous at x = 2 , then the value of f(2) is

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

B. 2

C. 4

D. 16

Answer: a

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58. If f(x) $= \frac{1+\sin x-\cos x}{1-\sin x-\cos x}, x \neq 0,$ is continuous at x = 0 , then f(0) = ...

A. 1

B. 0

C. -1

D. 2

Answer: c

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59. f(x) $= \frac{x^2}{2}$, if $0 \leq x < 1$
$= 2x^2 - 2x + \frac{3}{2}$, if $1 \leq x \leq 2$ is discontinuous at x $= \ldots\ldots$

A. 2

B. 1

C. 0

D. 1.5

Answer: b

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60. If f(x) $= px - q, \quad \text{if} \quad x \leq 1$
$= 3x, \quad \text{if} \quad 1 < x < 2$
$= qx^2 - p, \quad \text{if} \quad x \geq 2$

is continuous at x = 1 and dicontinuous at x = 2 , then

A. $p = -3$

B. $p + q = 3$

C. $p - q = 3, q = 3$

D. $p - q = 3, p \neq 6$

Answer: d

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61. Given f(x) $= \frac{\sin[(2k-3)x]}{4x}, \quad \text{if} \quad x < 0$
$= k + 1, \quad \text{if} \quad x = 0$
$= \frac{\tan[(3k-4)x]}{2x}, \quad \text{if} \quad x > 0$

If $\lim_{x \to 0}$ f(x) exists , then k =

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

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

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

D. $\frac{-4}{5}$

Answer: a

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62. The value of f(0) so that $f(x) = \frac{(4^x - 1)^3}{\sin\left(\frac{x}{4}\right)\log\left(1 + \frac{x^2}{3}\right)}, x \neq 0,$ is continuous everywhere in R, is

A. $3(\log 4)^3$

B. $4(\log 4)^3$

C. $12(\log 4)^3$

D. $15(\log 4)^3$

Answer: c

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63. $\lim_{x \to 0} \frac{|x|}{x} =$

A. 1

B. -1

C. 0

D. does not exist

Answer: d

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64. If f(x) $= \frac{1-\cos(10x)}{x^2}, \quad \text{if} \quad x < 0$
$= a, \quad \text{if} \quad x = 0$
$= \frac{\sqrt{x}}{\sqrt{625+\sqrt{x}}-25}, \quad \text{if} \quad x > 0$ is continuous at x = 0 , then a =

A. 25

B. 50

C. -25

D. 75

Answer: b

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65. If f(x) $= \frac{\log(1+3x) - \log(1-2x)}{x}, \quad \text{if } x \neq 0$
$= a, \quad \text{if } x = 0$ is continuous at x = 0, then a =

A. 5

B. 1

C. -1

D. 6

Answer: a

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66. If f(x) $= ax^2 + b, \quad \text{if} \quad 0 \leq x < 1$
$= x + 3, \quad \text{if} \quad 1 < x \leq 2$
$= 4, \quad \text{if} \quad x = 1$

then the values of (a,b) for which f(x) cannot be continuous at x = 1 are

A. $(2, 2)$

B. $(3, 1)$

C. $(4, 0)$

D. $(5, 2)$

Answer: d

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67. If f(t) = $\frac{1}{t^2 - t - 6}$ and $t = \frac{1}{x - 2}$ then the values of x which make the function f discontinuous are

A. $2, \frac{2}{3}, \frac{7}{3}$

B. $2, \frac{3}{2}, \frac{7}{3}$

C. $2, \frac{3}{2}, \frac{3}{7}$

D. $1, 2, \frac{2}{7}$

Answer: b

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68. The value of f(0) that the function

$f(x) = \frac{\sqrt[3]{1+x} - \sqrt[4]{1+x}}{x}, x \neq 0$, becomes continuous at x = 0 is

A. $\frac{1}{12}$

B. $\frac{7}{12}$

C. 0

D. 12

Answer: a

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69. The function $f(x) = \frac{x^3 + x^2 - 16x + 20}{x - 2}$ is not defined at x = 2. In order to make f(x) continuous at x = 2 , the value of f(2) should be defined as

A. 0

B. 1

C. 2

D. 3

Answer: a

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70. If f(x) $= \frac{x^n - 2^n}{x - 2}, \quad \text{if} \quad x \neq 2$
$= 1024, \quad \text{if} \quad x = 2$ is continuous at x = 2, then n =

A. 6

B. 7

C. 8

D. 3

Answer: c

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71. If the function f(x) $= 4(5^x), \ldots\ldots\ x < 0$ $= 8a + x, \ldots\ldots\ldots x \geq 0$ is continuous everywhere in R , then : a =

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

B. 2

C. 3

D. 4

Answer: a

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72. If f(x) $= \frac{x-|x|}{x}, \quad \ldots \ x \neq 0$
$= 2, \quad \ldots \ x = 0$ then : $\lim_{x \to 0} f(x)$ =

A. 2

B. 0

C. 1

D. does not exist

Answer: d

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73. If f(x) is continuous and $f\left(\frac{9}{2}\right) = \frac{2}{9}$, then : $\lim_{x \to 0} f\left(\frac{1-\cos 3x}{x^2}\right)$=

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

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

C. 18

D. 81

Answer: a

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74. If f(x) = $\frac{1}{1-x}$, then the points of dicontinuity of the composite function$(f_\circ f_\circ f)$ (x) are

A. $x = 0, -1$

B. $x = 0, 1$

C. $x = -1, 1$

D. $x = -2, 2$

Answer: b

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75. 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. 1

B. $1/2$

C. 2

D. -2

Answer: b

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76. If the function f(x) $\begin{matrix} = 5x - 4, & \ldots & 0 < x \leq 1 \\ = 4x^2 + 3bx, & \ldots & 1 < x < 2 \end{matrix}$ is continuous at every point of its domain , then : b =

A. $\frac{13}{3}$

B. 1

C. 0

D. -1

Answer: d

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77. 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. 3

B. 0

C. -6

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

Answer: b

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78. If f(x) $= \frac{\sin \pi x}{5x}, \quad \text{if} \quad x \neq 0$
$= k, \quad \text{if} \quad x = 0$ is continuous at x = 0 , then : k =

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

B. 5π

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

D. 1

Answer: c

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79. If $f(x) = |x - 2|$, then :

A. $\lim_{x \to 2^+} f(x) \neq 0$

B. $\lim_{x \to 2^-} f(x) \neq 0$

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

D. f(x) is continuous at x = 2

Answer: d

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80. Given $f(x) = ax^2 + b, \quad \text{if } x < -1$

$= bx^2 + ax + 4, \quad \text{if } x \geq -1$

If the derivartive of $f(x)$ is continuous everywhere in R, then :$(a, b) \equiv$

A. $(2, 3)$

B. $(3, 2)$

C. $(-2, -3)$

D. $(-3, -2)$

Answer: a

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81. If f(x) $= \frac{x^2-4x+3}{x^2-1}, \quad \ldots x \neq 1$
$= 2, \quad \ldots x = 1$ then :

A. $\lim_{x \to 1^+} f(x) = 2$

B. $\lim_{x \to 1^-} f(x) = 3$

C. f(x) is dicontinuous at x = 1

D. none of these

Answer: c

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82. If : f(x) $= \frac{\sin x}{x} + \cos x, \quad \ldots x \neq 0$
$= 2, \quad \ldots \ x = 0$ then :

A. $\lim_{x \to 0^+} f(x) = 2$

B. $\lim_{x \to 0^-} f(x) = 0$

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

D. none of these

Answer: c

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83. If : $f(x)$ $= 1, \quad \ldots$ x is rational
$= 0, \quad \ldots$x is irrational then : $\lim_{x \to 0} f(x) =$

A. 0

B. 1

C. $1/2$

D. none of these

Answer: b

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84. Let f(x) be given that $f(x) = \begin{cases} x & \text{if x is rational} \\ 1-x & \text{if x is irrational} \end{cases}$

The number of points at which f(x) is continuous, is

A. ∞

B. 1

C. 0

D. none of these

Answer: c

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85. The value of p and q for which the function $f(x) = \left\{ \frac{\sin(p+1)x + \sin x}{x}, x < 0q, x = 0 \frac{\sqrt{x+x^2} - \sqrt{x}}{x^{3/2}}, x > 0 \right\}$ is continuous for all x in R, are: (1) $p = \frac{1}{2}, q = -\frac{3}{2}$ (2) $p = \frac{5}{2}, q = -\frac{1}{2}$ (2) $p = -\frac{3}{2}, q = \frac{1}{2}$ (4) $p = \frac{1}{2}, q = \frac{3}{2}$

A. $\left(\frac{1}{2}m - \frac{3}{2}\right)$

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

C. $\left(-\frac{3}{2}, \frac{1}{2}\right)$

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

Answer: c

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86. If : f(x) $= 1, \quad \ldots 0 < x \leq \frac{3\pi}{4}$ $= 2.\sin\left(\frac{2x}{9}\right), \quad \ldots \frac{3\pi}{4} < x < \pi$ then :

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

B. f(x) is continuous at x = π

C. f(x) is continuous at x = $3\pi/4$

D. f(x) is discontinuous at x = $3\pi/4$

Answer: c

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87. If : f(x) $\begin{matrix} = x.\sin x, & \ldots\ 0 < x \leq \frac{\pi}{2} \\ = \frac{\pi}{2}\sin(\pi + x), & \ldots\ \frac{\pi}{2} < x < \pi \end{matrix}$, then

A. f(x) is discontinuous at $x = \pi/2$

B. f(x) is continuous at $x = \pi/2$

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

D. none of these

Answer: a

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88. Let : f(x) $= \frac{1-\cos 4x}{x^2}, \quad \ldots \quad x < 0$

$= a, \quad \ldots \quad x = 0$

$= \frac{\sqrt{x}}{\sqrt{16-\sqrt{x}}-4}, \quad \ldots \quad x > 0$

If f(x) is continuous at x = 0 , then : a =

A. 8

B. -8

C. 4

D. none of these

Answer: a

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89. If : f(x) $= ax^2 - b, \quad \ldots \quad 0 \leq x < 1$

$= 2, \quad \ldots \quad x = 1$

$= x + 1, \quad \ldots \quad 1 < x \leq 2$

is continuous at x= 1 , then the most suitable values of a and b are

A. $a = 2, b = 0$

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

C. $a = 4, b = 2$

D. all the above

Answer: d

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90. If : f(x) $\begin{matrix} = x^2, & \ldots & x \leq 1 \\ = x + 5, & \ldots & x > 1 \end{matrix}$ then :

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

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

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

D. none of these

Answer: b

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91. If : f(x) $= \frac{x^2+3x-10}{x^2+2x-15}, \quad \ldots \ x \neq -5$
$= a, \quad \ldots \ x = -5$ is continuous at x = 5 , then : a =

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

B. $\frac{7}{8}$

C. $\frac{8}{7}$

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

Answer: b

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92. If : f(x) $= x + \lambda, \quad \ldots \ x < 3$
$= 4, \quad \ldots \ x = 3$
$= 3x - 5, \quad \ldots \ x > 3$ is continuous at x = 3 , then : λ

A. 8

B. 1

C. -1

D. none of these

Answer: b

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93. If the function

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

is continuous in the interval $(\infty, 6)$ then : (a,b) $\equiv$

A. $(0, 2)$

B. $(1, 1)$

C. $(2, 0)$

D. $(2, 1)$

Answer: c

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94. The function f(x) $= x+2, \quad \ldots \ 1 \leq x \leq 2$
$= 4, \quad \ldots \ x = 2$
$= 3x-2, \quad \ldots \ x > 2$ is continuous at

A. $x = 2$only

B. $x \leq 2$

C. $x \geq 2$

D. none of these

Answer: c

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

B. f(0)=0

C. f(0)=e

D. none of these

Answer: c

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96. $f: R \to R$ is defined by $f(x) = \begin{cases} \dfrac{\cos 3x - \cos x}{x^2}, x \neq 0\lambda, x = 0 \end{cases}$ and f is continuous at $x = 0;$ then $\lambda =$

A. -2

B. -4

C. -6

D. -8

Answer: b

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

A. 0

B. 1

C. -1

D. none of these

Answer: b

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98. If : f(x) $\begin{matrix} \frac{1-\sin x}{\pi - 2x}, & \ldots \quad x \neq \pi/2 \\ = \lambda, & \ldots \quad x = \pi/2 \end{matrix}$ is continuous at $x = \pi/2$, then : $\lambda =$

A. -1

B. 1

C. 0

D. 2

Answer: c

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99. 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. $\sqrt{a}$

C. $-\sqrt{a}$

D. $-a\sqrt{a}$

Answer: c

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100. If $S_1 = \sum_{r=1}^{n} r$, $S_2 = \sum_{r=1}^{n} r^2$, $S_3 = \sum_{r=1}^{n} r^3$ then : $\lim_{n \to \infty} \frac{S_1\left(1 + \frac{S_8}{8}\right)}{(S_2)^2}$

=

A. $\frac{3}{22}$

B. $\frac{3}{64}$

C. $\frac{9}{32}$

D. $\frac{9}{64}$

Answer: d

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101. $\lim_{x \to \frac{\pi}{2}} \frac{a^{\cot x} - a^{\cos x}}{\cot x - \cot x}$ is equalt o

A. In $\left(\frac{\pi}{2}\right)$

B. In 2

C. In a

D. a

Answer: c

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102. $\lim_{x \to \infty} \left(1 - \frac{4}{x-1}\right)^{3x-1}$ =

A. e^{12}

B. e^{-12}

C. e^{4}

D. e^{3}

Answer: b

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103. If α is not an integral multiple of π , then : $\lim_{x \to \alpha} \left(\frac{\sin x}{\sin \alpha}\right)^{\frac{1}{x-\alpha}} =$

A. $e^{\cot \alpha}$

B. $e^{\tan \alpha}$

C. $e^{\sin \alpha}$

D. $e^{\cos \alpha}$

Answer: a

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104. $\lim_{h \to 0} \frac{\sin(a+3h) - 3\sin(a+2h) + 3\sin(a+h) - \sin a}{h^3} =$

A. $\sin a$

B. $-\sin a$

C. $\cos a$

D. $-\cos a$

Answer: c

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105. $\lim_{x \to n} (-1)^{[x]} =$

A. $(-1)^n$

B. $(-1)^{n-1}$

C. 0

D. does not exist

Answer: d

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106. Evaluate: $(\lim)_{h \to 0} \frac{2\left[\sqrt{3}\sin\left(\frac{\pi}{6}+h\right)-\cos\left(\frac{\pi}{6}+h\right)\right]}{\sqrt{3}h\left(\sqrt{3}\cosh-\sinh\right)}$

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

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

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

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

Answer: a

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107. If f(x) = 0 is a quadratic equation such that $f(-\pi) = f(\pi) = 0$ and $f\left(\frac{\pi}{2}\right) = -\frac{3\pi^2}{4}$, then : $\lim_{x \to -\pi} \frac{f(x)}{\sin(\sin x)} =$

A. 0

B. π

C. 2π

D. none of these

Answer: c

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108. $f(x)=\begin{cases} \frac{8^x-4^x-2^x+1}{x^2} & ;x>0 \\ e^x\sin x+\pi x+\lambda.\ln 4 & ;x\leq 0 \end{cases}$

is continuous at $x=0$, then: λ =

A. 4.In 2

B. 2.In 2

C. In 2

D. none of these

Answer: C

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109. If f(x) $f(x)=\frac{\log\left\{(1+x)^{1+x}\right\}-x}{x^2}, x\neq 0,$ is continuous at x = 0 ,

then : f(0) =

A. 1

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

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

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

Answer: b

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110. If the function f as defined below is continuous at x=0find the values of a,b and c

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

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

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

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

D. none of these

Answer: c

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111. Let : f(x) $= \frac{1-\cos 4x}{x^2}, \quad \ldots \quad x < 0$

$= a, \quad \ldots \quad x = 0$

$= \frac{\sqrt{x}}{\sqrt{16-\sqrt{x}}-4}, \quad \ldots \quad x > 0$

If f(x) is continuous at x = 0 , then : a =

A. 5

B. 6

C. 7

D. 8

Answer: d

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112. The function $\frac{x^3-8}{x^2-x-20}$ is continuous over the domain :

A. R

B. $R - \{5, 4\}$

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

D. $R - \{-5, 4\}$

Answer: d

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113. The value of a and b such that the function

f(x) $\begin{cases} -2\sin x, & -\pi \leq x \leq -\frac{\pi}{2} \\ a\sin x + b, & -\frac{\pi}{2} < x < \frac{\pi}{2} \\ \cos x, & \frac{\pi}{2} \leq x \leq \pi \end{cases}$ is continuous in $[-\pi, \pi]$ are

A. $-1, 0$

B. $1, 0$

C. $1, 1$

D. $-1, 1$

Answer: d

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114. The value of $\lim_{x \to e} \frac{\log x^2 - 2}{\sqrt{x} - \sqrt{e}}$ is

A. $4\sqrt{e}$

B. $2\sqrt{e}$

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

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

Answer: d

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115. If f(x) $= 4x - 3, \quad \text{for} \quad 0 < x \leq 2$
$= 4x + 3k \quad , \text{for} \quad x > 2$ is continuous at x = 2 , then k =

A. -1

B. 0

C. 1

D. 2

Answer: a

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116. If f(x) $= \frac{x^2-2x-3}{x-3}$, for $0 \leq x \leq 4$
$= \frac{x^2-1}{x+2}$, for $4 < x \leq 6$ then

A. f is continuous on its domain

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

C. f is continuous on its domain except at x = 4

D. f is continuous on its domain except at x = 3 and x = 4

Answer: b

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117. If the function f(x) $\frac{3\sin x - \sin 3x}{x^3}, x \neq 0$, is continuous at the point x = 0 , then : f(0) =

A. -4

B. 4

C. 0

D. 6

Answer: a,b,c,d

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118. If f(x) $\frac{2^x - 1}{1 - 3^x}, x \neq 0$ is continuous at x = 0 then : f(0) =

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

B. $-\log(2 - 3)$

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

D. $-\log_3 2$

Answer: a,b,c,d

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119. If f(0) = 2 , and f(x) = $\frac{1-\cos kx}{x.\sin x}$, $x \neq 0$, is continuous at x = 0 , then :

k =

A. ± 1

B. ± 2

C. ± 3

D. ± 4

Answer: a,b,c,d

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120. If f(x) $= \frac{x^n - 2^n}{x-2}, \quad \text{if} \quad x \neq 2$
$= 1024, \quad \text{if} \quad x = 2$ is continuous at x = 2, then n =

A. 6

B. 7

C. 8

D. 9

Answer: a,b,c,d

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121. If f(x) $\begin{matrix} \frac{3^{x+2}-81}{9^x-9^2}, & \ldots & x \neq 2 \\ = k.\log 3 & , \ \ldots & x = 2 \end{matrix}$ is continuous at x = 2 , then : k =

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

B. log 9

C. $\log_9 e$

D. 2

Answer: a,b,c,d

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122. If $f(x) = \begin{matrix} 2x^2 - 3, & \ldots \text{ if } & x < 2 \\ 5ax, & \ldots \text{ if } & x \geq 2 \end{matrix}$ is continuous at x = 2 , then : a =

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

B. 1

C. 2

D. 5

Answer: a,b,c,d

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123. If f(x) $\begin{matrix} = \frac{\sqrt{1+px} - \sqrt{1-px}}{x}, & \text{if } & -\frac{1}{2} \leq x < 0 \\ = 3x^2 + 2x - 2, & \text{if } & 0 \leq x < 1 \end{matrix}$ is continuous on its domain , then : p =

A. -4

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

C. -2

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

Answer: a,b,c,d

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124. If f(x) $= \frac{\sin 4x}{5x} + a, \quad \text{if} \quad x > 0$
$= 6x + 4 - b, \quad \text{if} \quad x \leq 0$ is continuous at x = 0 , then :

$a + b =$

A. $\frac{1}{15}$

B. 3

C. $-\frac{14}{5}$

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

Answer: a,b,c,d

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125. If f(x) $=\frac{1}{x}$ for all $x \neq 0$

then : $\lim_{x \to 0} f\left(\frac{1-\cos 5x}{x}\right) =$

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

B. $\frac{25}{2}$

C. $\frac{2}{25}$

D. ∞

Answer: D

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126. If f(x) $= \frac{\log(1-2x) - \log(1-3x)}{x}, \quad x \neq 0$
$= a, \quad x = 0$ is continuous at x = 0 ,

then : a =

A. 5

B. 1

C. -1

D. 6

Answer: a,b,c,d

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127. If f(x) $= -x^2, \quad \text{if } x \leq 0$
$= 5x - 4, \quad \text{if } 0 < x \leq 1$
$= 4x^2 - 3x, \quad \text{if } 1 < x \leq 2$ then f is

A. continuous at x = 0 ,1

B. discontinuous at x = 0,1

C. discntinuous at x = 0 but continuous t x=1

D. continuous at x = 0 but discontinuous at x= 1

Answer: a,b,c,d

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128. If f(x) $= \frac{(2^x - 1)^2}{\sin x . \log(1+x)}, \quad \text{if} \quad x \neq 0$
$= 2\log 2, \quad \text{if} \quad x = 0$ then , at x = 0 the function f is

A. continuous at x = 0 ,1

B. discontinuous

C. not defined

D. algebraic

Answer: a,b,c,d

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129. If f(t) = $\frac{1}{t^2 - t - 6}$ and $t = \frac{1}{x - 2}$ then the values of x which make the function f discontinuous are

A. $2, \frac{2}{3}, \frac{7}{3}$

B. $2, \frac{3}{2}, \frac{7}{3}$

C. $2, \frac{3}{2}, \frac{3}{7}$

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

Answer: a,b,c,d

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130. If f(x) $= \frac{1+\sin x-\cos x}{1-\sin x-\cos x}, x \neq 0$ is continuous at x = 0 , then : f(0) =

A. 1

B. 0

C. -1

D. 2

Answer: a,b,c,d

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131. If f(x) $= ax^2 + b, \quad \text{if} \quad 0 \leq x < 1$

$= x + 3, \quad \text{if} \quad 1 < x \leq 2$

$= 4, \quad \text{if} \quad x = 1$

then the values of (a,b) for which f(x) cannot be continuous at x = 1 are

A. $(1, 3)$

B. $(2, 2)$

C. $(4, 1)$

D. $(4, 0)$

Answer: a,b,c,d

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