MATHS

BOOKS - DEEPTI MATHS (TELUGU ENGLISH)

LIMITS AND CONTINUITY

Exercise 1A

1. $\underset{x \to -2}{\text{Lt}} \dfrac{x^4 + 2x^3 + 3x^2 + 5x - 2}{x^5 + 3x^4 + 2x^3 + 3x^2 + 7x + 2} =$

A. 5

B. -5

C. 8

D. 16

Answer: B

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2. $\underset{x \to -2}{\text{Lt}} \frac{(1+x)^2(1-x)^2}{(1+x)^3-(1-x)^3} =$

A. 1

B. $1/2$

C. $2/3$

D. $3/2$

Answer: C

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3. $\underset{x \to 2}{\text{Lt}} \frac{x^5-32}{x^3-8} =$

A. $20/3$

B. $3/2$

C. $\sqrt{3}/5$

D. $8/9$

Answer: A

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4. $\underset{x \to 1}{\text{Lt}} \dfrac{x^{-2/3} - 1}{x^{-3/4} - 1} =$

A. $20/3$

B. $3/2$

C. $\sqrt{3}/5$

D. $8/9$

Answer: D

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5. If $f(x) = \dfrac{4-7x}{3x+4}$ and $\underset{x \to 2}{\text{Lt}} f(x) = m$ then the equation whose roots are 1, 1/m is

A. $(x-1)^2 = 0$

B. $(x+1)^2 = 0$

C. $x^2 - 1 = 0$

D. none

Answer: C

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6. $\underset{x \to 1}{\text{Lt}} \dfrac{(2x-3)\left(\sqrt{x}-1\right)}{2x^2+x-3} =$

A. 0

B. 1

C. 2

D. $-\frac{1}{10}$

Answer: D

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7. Evaluate $Lt_{x \to 0} \frac{\sqrt{1+x}-1}{x}$

A. 0

B. 1

C. 2

D. $1/2$

Answer: D

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8. $\underset{x \to 0}{\text{Lt}} \frac{\sqrt[n]{1+x}-1}{x} =$

A. 0

B. n

C. $1/n$

D. $1/\sqrt{n}$

Answer: C

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9. $\underset{x \to 0}{\text{Lt}} \dfrac{\sqrt[3]{x+8}-2}{x} =$

A. 0

B. 1

C. $1/12$

D. $-1/12$

Answer: C

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10. $\underset{x \to 0}{\text{Lt}} \frac{\sqrt{1+x+x^2}}{x} =$

A. 0

B. 1

C. 2

D. $1/2$

Answer: D

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11. $\underset{x \to a}{\text{Lt}} \frac{\sqrt{(x+a)} - \sqrt{2}a}{x-a} =$

A. 2a

B. $2\sqrt{2}a$

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

D. $1/\sqrt{2}a$

Answer: C

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12. $\underset{x \to 0}{\text{Lt}} \frac{\sqrt{1+x} - \sqrt{1-x}}{x} =$

A. 0

B. 1

C. $\sqrt{2}$

D. $1/\sqrt{2}$

Answer: B

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13. $\underset{x \to 0}{\text{Lt}} \frac{\sqrt{a+x^2} - \sqrt{a-x^2}}{x^2} =$

A. 0

B. 1

C. $\sqrt{a}$

D. $1/\sqrt{a}$

Answer: D

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14. $\underset{x \to 0}{\text{Lt}} \dfrac{\sqrt{1+x^3} - \sqrt{1-x^3}}{x^3} =$

A. 0

B. 1

C. 2

D. $1/2$

Answer: B

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15. $\underset{x \to 0}{\text{Lt}} \frac{\sqrt[3]{1+x} - \sqrt[3]{1-x}}{x} =$

A. 1

B. $1/2$

C. $2/3$

D. $3/2$

Answer: C

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16. $\underset{x \to 0}{\text{Lt}} \frac{(1+x)^{1/4} - (1-x)^{1/4}}{x} =$

A. $1/2$

B. 0

C. -1

D. $-1/2$

Answer: A

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17. $\underset{x \to 0}{\text{Lt}} \dfrac{x}{\sqrt{x+4}-2} =$

A. 4

B. $\sqrt{2}$

C. $2\sqrt{2}$

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

Answer: A

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18. $\underset{x \to 1}{\text{Lt}} \dfrac{x-1}{\sqrt{x^2+3}-2} =$

A. 2

B. 3

C. -2

D. -3

Answer: A

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19. $\underset{x \to 0}{\text{Lt}} \dfrac{x}{1-\sqrt{1-x}} =$

A. 2

B. 3

C. -2

D. -3

Answer: A

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20. $\underset{x \to 0}{\text{Lt}} \dfrac{x^2}{1 - \sqrt[3]{1 - x^2}} =$

A. 2

B. 3

C. -2

D. -3

Answer: B

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21. $\underset{x \to -1}{\text{Lt}} \dfrac{x + 1}{2 - \sqrt{4 + x + x^2}} =$

A. $1/4$

B. 4

C. $1/2$

D. 2

Answer: B

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22. $\lim_{x \to 0} \frac{x}{\sqrt{4-x} - \sqrt{4+x}} =$

A. 2

B. 3

C. -2

D. -3

Answer: C

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23. $\lim_{x \to -8} \frac{\sqrt{1+\sqrt{1+x}} - 2}{x - 8} =$

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

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

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

D. ∞

Answer: C

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24. $\underset{x \to a}{\text{Lt}} \frac{\sqrt{a+2x} - \sqrt{3x}}{\sqrt{1+x^2} - \sqrt{1+x}} =$

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

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

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

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

Answer: D

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25. $\underset{x \to 0}{\text{Lt}} \frac{\sqrt{1-x} - \sqrt{1-x^2}}{\sqrt{1+x^2} - \sqrt{1+x}} =$

A. 1

B. -1

C. 0

D. 2

Answer: A

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26. $\underset{x \to 0}{\text{Lt}} \frac{\sqrt{4+x} - \sqrt{4+3x}}{x} =$

A. $-1/2$

B. $1/2$

C. -3

D. 0

Answer: A

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27. $\underset{x \to 1}{\text{Lt}} \dfrac{\sqrt[3]{x^2} - 2\sqrt[3]{x} + 1}{(x-1)^2} =$

A. $1/6$

B. $1/9$

C. $-1/6$

D. $-1/9$

Answer: B

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28. $\underset{x \to 2}{\text{Lt}} \left[\left(\dfrac{x^3 - 4x}{x^3 - 8} \right)^{-1} - \left(\dfrac{x + \sqrt{2}x}{x - 2} - \dfrac{\sqrt{2}}{\sqrt{x} - \sqrt{2}} \right)^{-1} \right]$

A. $1/2$

B. 2

C. 1

D. none

Answer: A

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29. $\underset{x \to 0}{\text{Lt}} \dfrac{5x - \sin 5x}{x} =$

A. 0

B. 1

C. 2

D. $1/2$

Answer: A

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30. $\underset{x \to 0}{\text{Lt}} \dfrac{5x - \sin 5x}{x} =$

A. ab/c

B. a^2b^3 / c^4

C. c/ab

D. c^4 / a^2b^3

Answer: B

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31. $\underset{x \to 0}{\text{Lt}} \dfrac{x \tan 7x}{\sin 3x \sin 4x} =$

A. 0

B. 1

C. $2/9$

D. $7/12$

Answer: D

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32. $\underset{x \to 0}{\text{Lt}} \dfrac{\tan 6x . \tan 5x}{\sin 3x \sin 4x} =$

A. 5

B. $5/2$

C. $3/7$

D. 5//3`

Answer: B

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33. $\underset{x \to 0}{\text{Lt}} \dfrac{3\sin x - \sin 3x}{x^3} =$

A. 4

B. -4

C. 8

D. -8

Answer: A

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34. $\underset{\theta \to 0}{\text{Lt}} \dfrac{3\tan\theta - \tan 3\theta}{2\theta^3}$

A. $1/4$

B. $3/4$

C. 4

D. -4

Answer: D

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35. $\underset{\theta \to 0}{\text{Lt}} \frac{a \sin ax - b \sin bx}{\tan ax - \tan bx} =$

A. $a^2 - b^2$

B. 0

C. a+b

D. a-b

Answer: C

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36. $\underset{x \to 0}{\text{Lt}} \frac{\sin 5x - \sin 3x}{\sin 4x - \sin 2x} =$

A. 0

B. 1

C. $2/9$

D. $7/12$

Answer: B

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37. $\lim_{x \to 0} \frac{\sin 7x - \sin 5x + \sin 3x - \sin x}{\sin 6x - \sin 4x + \sin 2x} =$

A. -1

B. 0

C. 1

D. 2

Answer: C

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38. $\lim_{x \to 0} \frac{1 - \cos x}{x} =$

A. 0

B. 1

C. 2

D. $1/2$

Answer: A

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39. $\underset{x \to 0}{\text{Lt}} \dfrac{1 - \cos x}{x^2} =$

A. 0

B. 1

C. 2

D. $1/2$

Answer: D

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40. $\underset{x \to 0}{\text{Lt}} \dfrac{1 - \cos x}{x \sin 2x} =$

A. $1/2$

B. $3/2$

C. $3/4$

D. $1/4$

Answer: D

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41. $\underset{x \to 0}{\text{Lt}} \dfrac{1 - \cos mx}{1 - \cos nx} =$

A. m/n

B. n/m

C. m^2/n^2

D. n^2/m^2

Answer: C

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42. $\underset{x \to 0}{\text{Lt}} \dfrac{\text{cosec x} - \cot x}{x} =$

A. 0

B. 1

C. 2

D. $1/2$

Answer: D

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43. $\underset{x \to 0}{\text{Lt}} \dfrac{\tan x - \sin x}{x^3} =$

A. 0

B. 1

C. 2

D. $1/2$

Answer: D

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44. $\underset{x \to 0}{\text{Lt}} \dfrac{\tan x - \sin x}{x^2} =$

A. 0

B. 1

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

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

Answer: A

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45. $\underset{x \to 0}{\text{Lt}} \dfrac{\cos ax - \cos bx}{x^2} =$

A. 0

B. 1

C. $\dfrac{a^2 - b^2}{2}$

D. $\dfrac{b^2 - a^2}{2}$

Answer: D

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46. $\underset{x \to 0}{\text{Lt}} \dfrac{\cos 5x - \cos 3x}{x^2} =$

A. 4

B. -4

C. 8

D. -8

Answer: D

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47. $\underset{x \to 0}{\text{Lt}} \dfrac{\cos 7x - \cos 9x}{\cos 3x - \cos 7x} =$

A. $5/2$

B. $2/5$

C. $7/5$

D. $4/5$

Answer: D

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48. $\underset{x \to 0}{\text{Lt}} \dfrac{1 - 2\cos x + \cos 2x}{x^2} =$

A. 0

B. 1

C. -1

D. none

Answer: C

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49. $\underset{x \to 0}{\text{Lt}} \dfrac{(1-\cos 2x)(3+\cos x)}{x \tan 4x}\Bigg)$ is equal to

A. 1

B. 2

C. $-1/4$

D. $1/2$

Answer: B

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50. $\underset{x \to 0}{\text{Lt}} \dfrac{1 - \cos^3 x}{x \sin x \cos x} =$

A. $2/5$

B. $3/5$

C. $3/2$

D. $3/4$

Answer: C

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51. $\underset{x \to 0}{\text{Lt}} \dfrac{\sin\left(\pi \cos^2 x\right)}{x^2}$ is equal to

A. $-\pi$

B. π

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

D. 1

Answer: B

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52. $\underset{x \to 0}{\text{Lt}} \frac{\tan^3 x - \sin^3 x}{x^5} =$

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

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

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

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

Answer: B

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53. The quadratic equation whose roots are l and m where

$$l = \lim_{\theta \to 0} \left(\frac{3\sin\theta - 4\sin^2\theta}{\theta} \right) \text{ and } m = \lim_{\theta \to 0} \frac{2\tan\theta}{\theta\left(1 - \tan^2\theta\right)} \text{ is}$$

A. $x^2 + 5x + 6 = 0$

B. $x^2 - 5x + 6 = 0$

C. $x^2 - 5x - 6 = 0$

D. $x^2 + 5x - 6 = 0$

Answer: B

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54. $\underset{x \to 0}{\text{Lt}} \frac{3\sin x^\circ - \sin 3x^\circ}{x^3} =$

A. 0

B. 1

C. $\left(\frac{\pi}{180}\right)^3$

D. $4.\left(\frac{\pi}{180}\right)^3$

Answer: D

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55. $\underset{x \to 0}{\text{Lt}} \frac{1-\cos 2x^\circ}{x^2} =$

A. 0

B. 1

C. $\left(\frac{\pi}{180}\right)^2$

D. $2.\left(\frac{\pi}{180}\right)^2$

Answer: D

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56. $\lim_{x \to \pi/2} \frac{\cos x}{\pi/2 - x} =$

A. 0

B. -1

C. 1

D. $1/2$

Answer: C

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57. $\lim_{x \to \pi/2} \frac{\cot x}{x - \pi/2} =$

A. 0

B. -1

C. 1

D. $1/2$

Answer: B

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58. $\lim_{x \to \pi/2} \frac{(\pi/2 - x)\sec x}{\text{cosec x}} =$

A. 0

B. -1

C. 1

D. $1/2$

Answer: C

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59. $\lim_{x \to \pi/2} \frac{\sec x - \tan x}{\pi/2 - x} =$

A. 0

B. 1

C. 2

D. $1/2$

Answer: B

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60. $\lim_{x \to \pi/2} \sec 5x \cos 7x =$

A. $5/7$

B. $-5/7$

C. $7/5$

D. $-7/5$

Answer: D

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61. $\lim_{x \to \pi/2} \frac{\cot x - \cos x}{(\pi/2 - x)^3} =$

A. 0

B. 1

C. 2

D. $1/2$

Answer: D

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62. $\lim_{\theta \to \pi/2} \frac{1 - \sin^2 \theta}{\cos \theta(\pi/2 - \theta)} =$

A. 1

B. -1

C. $-1/2$

D. $1/2$

Answer: A

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63. $\lim_{\theta \to \pi/2} \dfrac{[1-\tan(x/2)][1-\sin x]}{[1+\tan(x/2)][\pi-2x]^3} =$

A. $1/8$

B. 0

C. $1/32$

D. ∞

Answer: C

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64. $\lim_{x \to \pi/2} \dfrac{1-\sin^3 x}{\cos^2 x} =$

A. $3/2$

B. $2/3$

C. $2/5$

D. $-3/2$

Answer: A

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65. $\lim_{x \to 3\pi/2} \frac{\cos^2 x}{1 + \sin^3 x} =$

A. $3/2$

B. $2/3$

C. $2/5$

D. $-3/2$

Answer: B

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66. $\lim_{x \to 1} \frac{\tan^2 \pi x}{1 + \sec \pi x} =$

A. 0

B. 1

C. 2

D. -2

Answer: D

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67. $\underset{x \to 0}{\text{Lt}} \dfrac{\sec x - 1}{x^2(\sec x + 1)^2} =$

A. $1/8$

B. $11/4$

C. 2

D. 0

Answer: A

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68. $\lim_{x \to 1} (1-x)\tan(\pi x/2)=$

A. $2/\pi$

B. $3/\pi$

C. $4/\pi$

D. none

Answer: A

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69. $\lim_{x \to a} \frac{\text{cosec}(x-a)}{x-a} =$

A. 1

B. $-\infty$

C. -1

D. does not exist

Answer: B

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70. $\lim_{x \to a} \frac{\tan x - \tan a}{\sin a - \sin x} =$

A. sec a

B. $-\sec^2 a$

C. $\sec^3 a$

D. $-\sec^3 a$

Answer: D

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71. $\lim_{y \to x} \frac{\sin^2 y - \sin^2 x}{y - x} =$

A. sin 2y

B. sin 2x

C. $\cos^2 y$

D. $\cos^2 x$

Answer: B

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72. $\lim_{x \to 1} \frac{3 \sin \pi x - \sin 3\pi x}{(x-1)^3} =$

A. $-4\pi^3$

B. 0

C. 1

D. x^3

Answer: A

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73. $\lim_{x \to \pi/6} \left(\frac{3\sin x - \sqrt{3}\cos x}{6x - \pi} \right) =$

A. $\sqrt{3}$

B. $1/\sqrt{3}$

C. $-\sqrt{3}$

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

Answer: B

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74. $\lim_{x \to \pi/4} \frac{\sec x \tan(4x - \pi)}{\sin(\pi - 4x)} =$

A. 2

B. $\sqrt{2}$

C. $-\sqrt{2}$

D. $2\sqrt{2}$

Answer: C

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75. $\lim_{x \to \pi/4} \frac{1 - \cot^3 x}{2 - \cot x - \cot^3 x} =$

A. $11/4$

B. $3/4$

C. $1/2$

D. none

Answer: B

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76. $\lim_{x \to -2} \frac{\tan \pi x}{x + 2} + \lim_{x \to \infty} \left(1 + 1/x^2\right) =$

A. 3

B. π

C. $\pi + 1$

D. $\pi + 3$

Answer: C

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77. $\underset{x \to 0}{\text{Lt}} \frac{1 - \cos(1 - \cos x)}{x^4} =$

A. $1/2$

B. $1/4$

C. $1/8$

D. $1/12$

Answer: C

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78. Let α and β be the distinct roots of $ax^2 + bx + c = 0$, then $\lim_{x \to a} \frac{1 - \cos(ax^2 + bx + c)}{(x - \alpha)^2}$

A. $\frac{a^2}{2}(\alpha - \beta)^2$

B. 0

C. $-\frac{a^2}{2}(\alpha - \beta)^2$

D. $\frac{1}{2}(\alpha - \beta)^2$

Answer: A

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79. $\lim_{x \to 0} \frac{\cos^2 x - \sin^2 x - 1}{\sqrt{x^2 + 1} - 1} =$

A. 0

B. -4

C. 1

D. 4

Answer: B

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80. $\lim_{x \to 0} \frac{\sqrt{1+\sin x} - \sqrt{1-\sin x}}{x} =$

A. 0

B. -1

C. 2

D. 1

Answer: D

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81. $\underset{x \to 0}{\text{Lt}} \dfrac{\sqrt{1+\tan x} - \sqrt{1-\tan x}}{\sin x} =$

A. 0

B. 1

C. 2

D. $1/2$

Answer: B

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82. $\underset{x \to 0}{\text{Lt}} \dfrac{\sqrt{1+\sin x + \sin^2 x} - 1}{x} =$

A. 0

B. 1

C. 2

D. $1/2$

Answer: D

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83. $\lim_{x \to \pi/2} \left(\frac{\sqrt{1+\cos^3 x} - \sqrt{1-\cos^3 x}}{(\pi/2 - x)^3} \right) =$

A. 0

B. 1

C. $\pi/2$

D. $\pi/4$

Answer: B

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84. $\lim_{x \to \pi/2} \frac{\sqrt{1-\sin x}}{(\pi/2 - x)\sqrt{1+\sin x}} =$

A. $1/2$

B. $\pi/2$

C. 0

D. $-1/2$

Answer: A

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85. $\underset{x \to 0}{\text{Lt}} \dfrac{\sin^{-1} x}{x} =$

A. 0

B. 1

C. -1

D. $1/2$

Answer: B

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86. $\underset{x \to 0}{\text{Lt}} \frac{\tan^{-1} x}{x} =$

A. 0

B. 1

C. -1

D. $1/2$

Answer: B

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87. $\underset{x \to 0}{\text{Lt}} \frac{\sin^{-1} x - \tan^{-1}}{x} =$

A. 2

B. 1

C. -1

D. $1/2$

Answer: D

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88. $\lim_{x \to -1} \frac{\sqrt{x} - \sqrt{\cos^{-1} x}}{\sqrt{x} + 1} =$

A. $1/\sqrt{2}$

B. $1/\sqrt{2}x$

C. 1//sqrtx`

D. none

Answer: B

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89. $\underset{x \to 0}{\text{Lt}} \frac{\sqrt[3]{1 + \tan^{-1} 3x} - \sqrt[3]{1 - \sin^{-1} 3x}}{\sqrt{1 - \sin^{-2} 2x} - \sqrt{1 + \tan^{-1} 2x}}$

A. -1

B. 0

C. 1

D. 2

Answer: A

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90. $\underset{x \to 0}{\text{Lt}} \frac{\sin^{-1} ax - \sin^{-1} bx}{x} =$

A. 0

B. 1

C. a-b

D. none

Answer: C

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91. $\underset{x \to 0}{\text{Lt}} \frac{x\left(1-\sqrt{1-x^2}\right)}{\sqrt{1-x^2}.\left(\sin^{-1} x\right)^3} =$

A. 1

B. -1

C. $1/2$

D. 2

Answer: C

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92. $\underset{x \to 0}{\text{Lt}} \frac{\sinh x}{x} =$

A. 0

B. ∞

C. $-\infty$

D. 1

Answer: D

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93. $\underset{x \to 0}{\text{Lt}} \dfrac{\tan hx}{x} =$

A. 0

B. ∞

C. $-\infty$

D. 1

Answer: D

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94. $\underset{x \to 0}{\text{Lt}} \dfrac{\sqrt[5]{2+x} - \sqrt[5]{2-x}}{\sin hx} =$

A. 1

B. $\sqrt[5]{2}$

C. $\sqrt{5}/2$

D. $\sqrt[5]{2}/5$

Answer: D

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95. $\lim_{x \to 1} \frac{1 + \log x - x}{1 - 2x + x^2} =$

A. 1

B. 0

C. -1

D. $-1/2$

Answer: D

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96. $\lim_{x \to 1} \left\{ \frac{1}{x-1} - \frac{2}{x^2-1} \right\} =$

A. $1/2$

B. $1/8$

C. $7/2$

D. $1/32$

Answer: A

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97. $\lim_{x \to 1} \frac{1}{x-1} \left\{ \frac{1}{x+3} - \frac{2}{3x+5} \right\} =$

A. $1/2$

B. $1/8$

C. $7/2$

D. $1/32$

Answer: D

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98. $\lim_{x \to 2} \left\{ \frac{1}{x^2 + x - 6} - \frac{1}{2x^2 - 3x - 2} \right\} =$

A. $1/15$

B. $1/25$

C. $1/30$

D. $1/40$

Answer: B

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99. $\lim_{x \to 1/2} \left\{ \frac{8x - 3}{2x - 1} - \frac{4x^2 + 1}{4x^2 - 1} \right\} =$

A. $1/2$

B. $1/8$

C. $7/2$

D. $1/32$

Answer: C

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100. $\underset{x \to 0}{\text{Lt}} \frac{1}{\sin^2 x} - \frac{1}{\sinh^2 x} =$

A. $2/3$

B. 0

C. $1/3$

D. $-2/3$

Answer: A

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101. $\lim_{x \to \infty} \frac{(x+1)(2x+3)}{(x+2)(3x+4)} =$

A. $7/2$

B. $-5/4$

C. $2/3$

D. $2/7$

Answer: C

Watch Video Solution

102. $\lim_{x \to \infty} \frac{(x+1)(2x+3)}{(x+2)(3x+4)} =$

A. 0

B. ∞

C. 1

D. a

Answer: C

Watch Video Solution

103. $\lim_{x \to \infty} \frac{2x + 7}{x^2 + 5x + 4} =$

A. 0

B. 1

C. 2

D. $1/2$

Answer: A

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104. $\lim_{x \to \infty} \frac{3x^2 + 5x + 2}{2x^2 - 3x + 1} =$

A. $2/3$

B. $3/2$

C. 3

D. $1/2$

Answer: B

Watch Video Solution

105. $\lim_{x \to \infty} \frac{3x^3 + x^2 - 1}{x^2 - x + 7} =$

A. 0

B. 1

C. ∞

D. $-\infty$

Answer: C

Watch Video Solution

106. $\lim_{x \to \infty} \frac{-x^3 + 8}{2x^2 + 5x + 7} =$

A. 0

B. 1

C. ∞

D. $-\infty$

Answer: D

Watch Video Solution

107. $\lim_{x \to \infty} \frac{|3x^2 + 1|}{2x^2 + 1} =$

A. $3/2$

B. $2/3$

C. $-3/2$

D. $-2/3$

Answer: A

Watch Video Solution

108. $\lim_{x \to \infty} \frac{\sqrt{3x^2 + 5}}{5x + 3} =$

A. $20/3$

B. $3/2$

C. $\sqrt{3}/5$

D. $8/9$

Answer: C

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109. $\lim_{x \to 0} 2(\sqrt{x}) =$

A. 0

B. ∞

C. $1/2$

D. 1\(sqrt2)

Answer: A

Watch Video Solution

110. $\lim_{x \to \infty} \frac{\sqrt{1+25x^2}+\sqrt{9x^2-1}}{\sqrt{1+25x^2}-\sqrt{9x^2-1}}$

A. 1

B. 2

C. 3

D. 4

Answer: D

Watch Video Solution

111. $\lim_{x \to \infty} \frac{\sqrt{1+9x^2}+\sqrt{x^2-1}}{\sqrt{1+9x^2}-\sqrt{x^2-1}} =$

A. 1

B. 2

C. 3

D. 4

Answer: B

Watch Video Solution

112. $\lim_{x \to \infty} \left(\frac{\sqrt{x^2+1}-\sqrt[3]{x^2+1}}{\sqrt[4]{x^4+1}-\sqrt[5]{x^4+1}} \right) =$

A. 0

B. 1

C. $1/2$

D. $1/4$

Answer: B

Watch Video Solution

113. $\lim_{x \to \infty} \frac{(x+1)^{10} + (x+2)^{10} + \ldots + (x+10)^{10}}{x^{10} + 10^{10}} = \ldots$

A. 0

B. 1

C. -1

D. 10

Answer: D

Watch Video Solution

114. $\lim_{x \to \infty} \left(\frac{x^3}{3x^2 - 1} - \frac{x^2}{3x + 1} \right) =$

A. 0

B. $1/9$

C. ∞

D. none

Answer: B

Watch Video Solution

115. $\lim_{x \to \infty} \left\{ \sqrt{x^2 + ax + b} - x \right\} =$

A. 0

B. a

C. $a/2$

D. $-a/2$

Answer: B

Watch Video Solution

116. $\lim_{x \to \infty} \left\{x - \sqrt{x^2 + x}\right\} =$

A. 0

B. 1

C. $1/2$

D. $-1/2$

Answer: D

Watch Video Solution

117. $\lim_{x \to \infty} \sqrt{x}\left(\sqrt{x + c} - \sqrt{x}\right) =$

A. 1

B. ∞

C. c

D. $c/2$

Answer: D

Watch Video Solution

118. $\lim_{x \to \infty} x^{3/2}\left(\sqrt{x^3+1}-\sqrt{x^3-1}\right) =$

A. 1

B. -1

C. 0

D. none

Answer: A

Watch Video Solution

119. $\lim_{x \to \infty} \left[\sqrt{x^2+2x-1}-x\right] =$

A. ∞

B. $1/2$

C. 4

D. 1

Answer: D

Watch Video Solution

120. If $\lim_{x \to \infty} \left(\sqrt{x^2 - ax} - x\right) = \frac{1}{2}$ then a=

A. 2

B. 0

C. -1

D. $1/2$

Answer: C

Watch Video Solution

121. The values of constants a so that $\lim_{x \to \infty} \left(\frac{x^2 + 1}{x + 1} - ax - b \right) = 0$ are

A. 2

B. -2

C. 0

D. 1

Answer: D

Watch Video Solution

122. $\lim_{x \to \infty} \left\{ \sin \sqrt{x + 1} - \sin \sqrt{x} \right) =$

A. 0

B. 1

C. $1/2$

D. $-1/2$

Answer: C

Watch Video Solution

123. $\lim_{x \to \infty} \left\{ \sqrt{x^2 + 1} - \sqrt{x^2 - 1} \right\} =$

A. 0

B. 1

C. $1/2$

D. $-1/2$

Answer: A

Watch Video Solution

124. $\lim_{n \to \infty} \left(\sqrt{n^4 + 1} - \sqrt{n^4 - 1} \right) =$

A. 2

B. 0

C. $1/2$

D. none

Answer: B

Watch Video Solution

125. $\lim_{x \to \infty} \left[\sqrt{x + \sqrt{x + \sqrt{x}}} - \sqrt{x}\right] =$

A. 0

B. $1/2$

C. log 2

D. e_4

Answer: B

Watch Video Solution

126. $\lim_{n \to \infty} \frac{1+2+3+\ldots+n}{n^2} =$

A. 1

B. $1/2$

C. $1/3$

D. $1/4$

Answer: B

Watch Video Solution

127. $\lim_{n \to \infty} \frac{1^2+2^2+3^2+\ldots+n^2}{n^3} =$

A. 1

B. $1/2$

C. $1/3$

D. $1/4$

Answer: C

Watch Video Solution

128. $\lim_{n \to \infty} \frac{1^3 + 2^3 + 3^3 + \ldots + n^3}{n^4} =$

A. 1

B. $1/2$

C. $1/3$

D. $1/4$

Answer: D

Watch Video Solution

129. $\lim_{n \to \infty} \frac{1 + 3 + 5 + \ldots. + (2n - 1)}{2 + 4 + 6 + . .2n}$

A. 1

B. $1/2$

C. $1/3$

D. $1/4$

Answer: A

Watch Video Solution

130. $\lim_{n \to \infty} \frac{1}{n^3} \sum_{k=1}^{n} [k^2 x] =$

A. x

B. x/2

C. x/3

D. x/4

Answer: C

Watch Video Solution

131. $\lim_{n \to \infty} \frac{n\left(1^3 + 2^3 + \ldots + n^3\right)^2}{\left(1^2 + 2^2 + \ldots + n^2\right)^3} =$

A. $27/16$

B. 16//27`

C. $9/4$

D. $4/9$

Answer: A

Watch Video Solution

132. $\lim_{n \to \infty} \frac{(1 + 2 + \ldots. + \text{n terms})\left(1^2 + 2^2 + \ldots + \text{n terms}\right)}{n\left(1^3 + 2^3 + \ldots + \text{n terms}\right)} =$

A. $3/2$

B. $2/3$

C. 1

D. 0

Answer: B

Watch Video Solution

133. $\lim_{n \to \infty} \frac{1 + 3 + 6 + \ldots + n(n+1)/2}{n^3} =$

A. $1/2$

B. $1/3$

C. $1/6$

D. $1/8$

Answer: C

Watch Video Solution

134. $\lim_{n \to \infty} \frac{1}{n^4}\left[1^2 + \left(1^2 + 2^2\right) + \ldots. + \left(1^2 + 2^2 + \ldots + n^2\right]\right. =$

A. $1/6$

B. $1/16$

C. $1/12$

D. 0

Answer: C

Watch Video Solution

135. $\lim_{n \to \infty} \left\{ \frac{1}{2} + \frac{1}{2^2} + \frac{1}{2^3} + \ldots + \frac{1}{2^n} \right\} =$

A. 1

B. $1/2$

C. $1/3$

D. 3

Answer: A

Watch Video Solution

136. If $0 < r < 1$ then $\underset{n \to \infty}{\text{Lt}} \left(a + ar + \ldots + ar^{n-1}\right) =$

A. 0

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

C. $\frac{a}{1-r}$

D. none

Answer: C

Watch Video Solution

137. $\lim_{n \to \infty} \frac{1 + 3 + 3^2 + \ldots 3^n}{1 + 2 + 2^2 + \ldots + 2^n} =$

A. 0

B. $3/2$

C. ∞

D. none

Answer: C

Watch Video Solution

138. $\lim_{n \to \infty} \frac{1 + a + a^2 + \ldots . + a^{n-1}}{1 + b + b^2 + \ldots + b^{n-1}} = 0$ if

A. a=b

B. $a < b, b > 1$

C. $a > b, a > 1$

D. $1 < a < b$

Answer: B

Watch Video Solution

139. $\lim_{n \to \infty} \left\{ \frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \ldots + \frac{1}{n(n+1)} \right\} =$

A. 0

B. 1

C. -1

D. $1/2$

Answer: B

Watch Video Solution

140. $\lim_{n \to \infty} \left\{ \frac{1}{1.3} + \frac{1}{3.5} + \frac{1}{5.7} + \ldots . + \frac{1}{(2n-1)(2n+1)} \right\} =$

A. 1

B. $1/2$

C. $1/13$

D. $1/6$

Answer: B

Watch Video Solution

141. $\lim_{n \to \infty} \left\{ \frac{1}{1.4} + \frac{1}{4.7} + \frac{1}{7.10} + ... + \frac{1}{(3n-2)(3n+1)} \right\} =$

A. 1

B. $1/2$

C. $1/3$

D. $1/6$

Answer: C

Watch Video Solution

142. $\lim_{n \to \infty} \frac{1.1! + 2.2! + 3.3! + ... + n.\, n!}{(n+1)!} =$

A. 0

B. ∞

C. 1

D. none

Answer: C

Watch Video Solution

143. $\lim_{n \to \infty} \frac{2^n - n}{2^n} =$

A. 0

B. 1

C. $-\infty$

D. ∞

Answer: B

Watch Video Solution

144. $\lim_{n \to \infty} \frac{2^n - 1}{3^n + 1} =$

A. 0

B. 1

C. $-\infty$

D. ∞

Answer: A

Watch Video Solution

145. $\lim_{n \to \infty} \frac{5^n + 1}{3^n - 1} =$

A. 0

B. 1

C. $-\infty$

D. ∞

Answer: D

Watch Video Solution

146. $\lim_{n \to \infty} \frac{3^{x+1}+4}{3^{x+2}+4} =$

A. `3

B. $1/3$

C. 1

D. ∞

Answer: B

Watch Video Solution

147. $\lim_{n \to \infty} \frac{2^{1/n}-1}{2^{1/n}+1} =$

A. $6/5$

B. $2/7$

C. $-2/7$

D. $-6/7$

Answer: D

Watch Video Solution

148. $\lim_{n \to \infty} \frac{2^{1/n} - 1}{2^{1/n} + 1} =$

A. 0

B. 1

C. -1

D. $1/2$

Answer: A

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149. If $a > 1$, then $\underset{x \to \infty}{\text{Lt}} \frac{a^x - a^{-x}}{a^x + a^{-x}} =$

A. e

B. a

C. 1

D. 0

Answer: C

Watch Video Solution

150. If $a > 1$, then $\frac{a^x - x^{-x}}{a^x + a^{-x}} =$

A. `-1

B. 0

C. 1

D. ∞

Answer: C

Watch Video Solution

151. $\lim_{n \to \infty} \frac{{}^{n}P_{n}}{{}^{n+1}P_{n+1} - {}^{n}P_{n}} =$

A. 1

B. 0

C. -1

D. none

Answer: B

Watch Video Solution

152. If $|x| < 1$ thn $\underset{n \to \infty}{\text{Lt}} (1+x)(1+x^2)(1+x^4)\ldots.(1+x^{2n}) =$

A. $1/(x-1)$

B. $1/(1-x)$

C. 0

D. 1-x

Answer: B

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153. $\underset{x \to \infty}{\text{Lt}} \dfrac{3\sqrt{x} + \log x - \sin^2 x}{5\sqrt{x} + 6\cos^2 x - 100 \log x} =$

A. $1/3$

B. $3/5$

C. $-5/3$

D. $-3/5$

Answer: B

Watch Video Solution

154. $\underset{x \to 1}{\text{Lt}} \dfrac{\log(1-x)}{\cot \pi x} =$

A. `-1

B. 0

C. 1

D. 2

Answer: B

Watch Video Solution

155. $\underset{x \to \infty}{\text{Lt}} 5^x \sin\left(\frac{a}{5^x}\right) =$

A. 0

B. 5

C. log 5

D. a

Answer: D

Watch Video Solution

156. $\underset{x \to 0}{\text{Lt}} \dfrac{(2+x)\sin(2+x) - 2\sin 2}{x} =$

A. sin 2

B. cos 2

C. 2 sin 2 +cos 2

D. 2 cos 2 +sin 2

Answer: D

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157. $\underset{x \to 0}{\text{Lt}} \dfrac{\sin(x+a) + \sin(a-x) - 2\sin a}{x \sin x} =$

A. sin a

B. $-\sin a$

C. cos a

D. $-\cos a$

Answer: B

Watch Video Solution

158. $\underset{x \to 0}{\text{Lt}} \dfrac{\sin(x+a) + \sin(a-x) - 2\sin a}{x \sin x} =$

A. $a(a\cos a + 2\sin a)$

B. $a(a\cos a - 2\sin a)$

C. $(a\cos a + 2\sin a)$

D. $(a\cos a - 2\sin a)$

Answer: A

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159. If $\underset{x \to 0}{\text{Lt}} \dfrac{x(1 + a\cos x) - b\sin x}{x^3} = 1$ then $(a, b) =$

A. (0,3/2)

B. (1,2/3)

C. (5/2,-2/3)

D. (-5/2,-3/2)

Answer: D

Watch Video Solution

160. If $\underset{x \to 0}{\text{Lt}} \left(\frac{\cos 4x + a \cos 2x + b}{x^4} \right)$ is finite, then the value of a, b are respectiveluy.

A. 5,-4

B. $-5, \ -4$

C. $-4, 3$

D. 4,5

Answer: C

Watch Video Solution

161. $\underset{x \to 1}{\text{Lt}} \dfrac{x + x^2 + \ldots + x^n - n}{x - 1} =$

A. $\dfrac{n(n+1)}{2}$

B. $\dfrac{n(n+1)(2n+1)}{6}$

C. $\dfrac{n^2(n+1)^2}{4}$

D. none

Answer: A

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162. $\underset{x \to 0}{\text{Lt}} \dfrac{2}{x} \log(1 + x) =$

A. 1

B. 2

C. 3

D. 4

Answer: B

Watch Video Solution

163. $\underset{x \to 0}{\text{Lt}} \dfrac{\log_e(1+x)}{3^x - 1} =$

A. $\log_e 3$

B. 0

C. 1

D. $\log_3 e$

Answer: D

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164. $\underset{x \to 0}{\text{Lt}} \left\{ \dfrac{1}{x} - \dfrac{\log(1+x)}{x^2} \right\} =$

A. 0

B. 1

C. $1/2$

D. $-1/2$

Answer: C

Watch Video Solution

165. $\underset{x \to 0}{\text{Lt}} \dfrac{x \cos - \log(1+x)}{x^2} =$

A. $1/2$

B. 0

C. 1

D. none

Answer: A

Watch Video Solution

166. $\underset{x \to 0}{\text{Lt}} \left(\frac{1}{\log x} - \frac{x}{x-1} \right) =$

A. 2

B. -2

C. 4

D. $-1/2$

Answer: D

Watch Video Solution

167. $\underset{x \to 0}{\text{Lt}} \left(\frac{1}{x} - \frac{1}{e^x - 1} \right) =$

A. $1/2$

B. 2

C. $1/3$

D. 3

Answer: A

Watch Video Solution

168. $\underset{x \to \infty}{\text{Lt}} x[, \log(x+1) - \log x] =$

A. 0

B. -1

C. 1

D. e

Answer: C

Watch Video Solution

169. $\underset{x \to o}{\text{Lt}} \log \left| \frac{\log(1+x)}{x} \right| =$

A. 0

B. 1

C. e

D. $1/e$

Answer: A

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170. If $\underset{x \to o}{\text{Lt}} \frac{\log(3+x) - \log(3-x)}{x} = k$ then k=

A. 0

B. $-1/3$

C. $2/3$

D. $-2/3$

Answer: C

Watch Video Solution

171. $\underset{x \to o}{\text{Lt}} \frac{\sin x - x}{x^3} =$

A. $1/6$

B. $-1/6$

C. $1/5$

D. $-1/5$

Answer: B

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172. $\underset{x \to o}{\text{Lt}} \left\{ \text{cosec x} - \frac{1}{x} \right\}$

A. 0

B. 1

C. -1

D. 2

Answer: A

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173. $\underset{x \to o}{\text{Lt}} \frac{\text{cosec x} - \frac{1}{x} - \frac{x}{6}}{x^3} =$

A. $3/360$

B. `2//360

C. $7/360$

D. $11/360$

Answer: C

View Text Solution

174. $\underset{x \to o}{\text{Lt}} \frac{\text{cosec x} - \frac{1}{x} - \frac{x}{6}}{x^3} =$

A. $1/120$

B. $1/110$

C. $1/100$

D. $1/90$

Answer: A

View Text Solution

175. $\lim_{y \to x} \frac{y^y - x^x}{y - x} =$

A. xy^{x-1}

B. x^x

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

D. none

Answer: C

Watch Video Solution

176. If $a > 0$ and $\underset{x \to a}{\text{Lt}} \frac{a^x - x^a}{x^x - a^a} = -1$ then $a =$

A. 0

B. 1

C. 3

D. 2e

Answer: B

Watch Video Solution

177. $\underset{x \to -\infty}{\text{Lt}} e^x =$

A. 0

B. 1

C. $-\infty$

D. ∞

Answer: A

Watch Video Solution

178. $\underset{x \to 0}{\text{Lt}} \frac{e^{mx} - 1}{x} =$

A. e

B. m

C. e^m

D. m log a

Answer: B

Watch Video Solution

179. $\underset{y \to 0}{\text{Lt}} \frac{a^x - 1}{b^x - 1} =$

A. $\frac{\log a}{\log b}$

B. $\log \frac{a}{b}$

C. $\log(a-b)$

D. $\log a^b$

Answer: A

Watch Video Solution

180. $\underset{x \to 0}{\text{Lt}} \frac{a^x - b^x}{x} =$

A. 0

B. 1

C. $\log\left(\frac{a}{b}\right)$

D. $\frac{\log a}{\log b}$

Answer: C

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181. $\underset{x \to 0}{\text{Lt}} \frac{a^{\tan x} - 1}{x} =$

A. 1

B. a

C. 2 log a

D. log a

Answer: D

Watch Video Solution

182. $\underset{x \to 0}{\text{Lt}} \frac{e^{\sin x} - 1}{x} =$

A. 1

B. e

C. e^{-1}

D. 0

Answer: A

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183. $\lim_{x \to 0} \frac{e^{\tan x} - 1}{\sin x} =$

A. 1

B. e

C. e^{-1}

D. 0

Answer: A

Watch Video Solution

184. $\lim_{x \to 0}$ (x 2^(x)-x)/(1-cos x)=`

A. 0

B. 1

C. log 2

D. log 4

Answer: D

Watch Video Solution

185. $\underset{x \to 0}{\text{Lt}} \dfrac{x.\,10^x - x}{1 - \cos x} =$

A. log 10

B. 2 log 10

C. 3 log 10

D. 4 log 10

Answer: B

Watch Video Solution

186. $\underset{x \to 0}{\text{Lt}} \dfrac{2^x - 1}{\left(\sqrt{1+x} - 1\right)} =$

A. 0

B. 1

C. log 2

D. log 4

Answer: D

Watch Video Solution

187. $\underset{x \to 0}{\text{Lt}} \dfrac{a^x - 1}{\sqrt{a+x} - \sqrt{a}} =$

A. $2\sqrt{a}\log a$

B. $\sqrt{a}\log a$

C. log a

D. none

Answer: A

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188. $\underset{x \to 0}{\text{Lt}} \dfrac{\sqrt{1+x^2} - \sqrt{1-x+x^2}}{3^x - 1} =$

A. log 9

B. $\dfrac{1}{\log 9}$

C. log 3

D. $\dfrac{1}{\log 3}$

Answer: B

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189. $\underset{x \to 0}{\text{Lt}} \dfrac{5^x + 3^x - 2^x - 1}{x} =$

A. 5

B. 1

C. log 20

D. log 15/2

Answer: D

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190. $\underset{x \to 0}{\text{Lt}} \frac{(ab)^x - a^x - b^x + 1}{x^2} =$

A. log a log b

B. log (ab)

C. log a/b

D. log b/a

Answer: A

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191. $\underset{x \to 0}{\text{Lt}} \dfrac{10^x - 2^x - 5^x + 1}{x^2} =$

A. log 5

B. log 2

C. log 5.log 2

D. log 5/log 2

Answer: C

Watch Video Solution

192. $\underset{x \to 0}{\text{Lt}} \left(\dfrac{a^x + b^x}{2} \right)^{1/x} =$

A. ab

B. a+b

C. $\sqrt{a}b$

D. none

Answer: C

Watch Video Solution

193. $\underset{x \to 0}{\text{Lt}} \left(\frac{16^x + 9^x}{2} \right)^{1/x} =$

A. 25/2

B. 12

C. 1

D. 0

Answer: B

Watch Video Solution

194. $\underset{x \to \infty}{\text{Lt}} \left[\frac{a^{1/x} + b^{1/x} + c^{1/x}}{3} \right]^x$, where a,b,c are real and nonzero=

A. 0

B. $(abc)^{1/3}$

C. $(abc)^{-1/3}$

D. abc/3

Answer: B

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195. The value of $\underset{x \to 0}{\text{Lt}} \left(\frac{a_1^{1/x} + a_2^{1/x} + \ldots . + a_n^{1/x}}{n} \right)^{nx}$ is

A. $a_1 + a_2 + \ldots + a_n$

B. $e^{a_1 + a_2 + \ldots + a_n}$

C. $\frac{a_1 + a_2 + \ldots + a_n}{n}$

D. $a_1 a_2 \ldots . a_n$

Answer: D

Watch Video Solution

196. $\underset{x \to 0}{\text{Lt}} \left(\frac{1^x + 2^x + 3^x + ... + n^x}{n} \right)^{1/x}$

A. $(n!)^n$

B. $(n!)^{1/n}$

C. n!

D. ln (n!)

Answer: B

Watch Video Solution

197. $\underset{x \to 0}{\text{Lt}} \frac{e^{x^2} - \cos x}{x^2} =$

A. 0

B. 1

C. $1/2$

D. $3/2$

Answer: D

Watch Video Solution

198. $\underset{x \to 0}{\text{Lt}} \dfrac{(1-e^x)\sin x}{x^2+x^3} =$

A. -1

B. 0

C. 1

D. 2

Answer: A

Watch Video Solution

199. $\underset{x \to 0}{\text{Lt}} \dfrac{e^{\tan x}-e^x}{\tan x - x} =$

A. 1

B. e

C. e^{-1}

D. 0

Answer: A

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200. $\lim_{x \to 0} \frac{e^x - e^{\sin x}}{2(x - \sin x)} =$

A. $-1/2$

B. $1/2$

C. 1

D. $3/2$

Answer: B

Watch Video Solution

201. $\underset{x \to 0}{\text{Lt}} \dfrac{x^a - a^a}{a^x - a^n} =$

A. 0

B. a^a

C. $\log_e a$

D. $\log_a e$

Answer: D

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202. $\underset{x \to a}{\text{Lt}} \dfrac{e^a - e^x}{e^{x+a}(x - a)} =$

A. $-1/e^a$

B. e^{-a}

C. a^a

D. none

Answer: A

Watch Video Solution

203. $\underset{x \to 1}{\text{Lt}} \dfrac{\sin\left(e^{x-1}-1\right)}{\log x} =$

A. 1

B. 0

C. e

D. none

Answer: A

Watch Video Solution

204. $\underset{x \to 0}{\text{Lt}} (1+2x)^{1/x} =$

A. e

B. e^2

C. e^3

D. $-e$

Answer: B

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205. $\underset{x \to 0}{\text{Lt}} (1+x)^{2/x} =$

A. e

B. e^2

C. e^3

D. $-e$

Answer: B

Watch Video Solution

206. $\underset{x \to 0}{\text{Lt}} (1 + \sin x)^{\cot x} =$

A. e

B. e^2

C. e^3

D. e^4

Answer: D

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207. $\underset{x \to 0}{\text{Lt}} (1 + \tan x)^{\cot x} =$

A. -1

B. 0

C. 1

D. e

Answer: D

Watch Video Solution

208. $\underset{x \to 0}{\text{Lt}} \left(1 + \frac{3}{x}\right)^x =$

A. e

B. e^2

C. e^3`

D. $-e$

Answer: C

Watch Video Solution

209. The value of $\underset{x \to 0}{\text{Lt}} \frac{(1+x)^{1/x} - e}{x}$ is

A. 1

B. $e/2$

C. $-e/2$

D. $2/e$

Answer: C

Watch Video Solution

210. $\underset{x \to \infty}{\text{Lt}} \left(\frac{x+1}{x+2} \right)^{x+3} =$

A. 0

B. 1

C. e

D. 1/e

Answer: D

Watch Video Solution

211. $\lim_{x \to \infty} \left(\frac{x+5}{x+2} \right)^{x+3} =$

A. e

B. e^2

C. e^3

D. e^5

Answer: C

Watch Video Solution

212. $\lim_{x \to \infty} \left(\frac{x+6}{x+1} \right)^{x+4} =$

A. e^4

B. e^6

C. e^5

D. e

Answer: C

Watch Video Solution

213. $\underset{x \to 0}{\text{Lt}} \left(\frac{x+a}{x+b} \right)^{x+b} =$

A. 1

B. e^{b-a}

C. e^{a-b}

D. e^{b}

Answer: C

Watch Video Solution

214. $\underset{x \to \infty}{\text{Lt}} \left(\frac{x^2+5x+3}{x^2+x+2} \right)^{x} =$

A. e^4

B. $-e$

C. e

D. e^2

Answer: A

Watch Video Solution

215. $\underset{x \to \infty}{\text{Lt}} \left(\frac{x}{1+x} \right)^x =$

A. 0

B. 1

C. e

D. $1/e$

Answer: D

Watch Video Solution

216. If a,b,c,d are positive real numbers then $\underset{n\to\infty}{\text{Lt}}\left(1+\frac{1}{a+bn}\right)^{c+dn}=$

A. $e^{d/b}$

B. $e^{c/a}$

C. $e^{\frac{c+d}{a+b}}$

D. e

Answer: A

Watch Video Solution

217. If $\underset{x\to 0}{\text{Lt}}\left(1+\frac{a}{x}+\frac{b}{x^2}\right)^{2x}=e^2$, then the value of a and b are

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

B. $a=1$ and $b=2$

C. $a\in R, b=2$

D. $a = 1, b \in R$

Answer: D

Watch Video Solution

218. $\underset{x \to 0}{\text{Lt}} (1 + \sin x)^{\cot x} =$

A. e

B. e^2

C. e^3

D. e^4

Answer: A

Watch Video Solution

219. $\underset{x \to 0}{\text{Lt}} (\cos x + a \sin bx)^{1/x} =$

A. e^a

B. e^b

C. $e^{a/b}$

D. e^{ab}

Answer: D

Watch Video Solution

220. $\lim_{x \to \infty} \left(\frac{x^2 + 2x - 1}{2x^2 - 3x - 2} \right)^{\frac{2x+1}{2x-1}} =$

A. $-1/2$

B. $-1/4$

C. $e^{1/4}$

D. $e^{-1/4}$

Answer: A

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221. $\lim_{x->0} \frac{e^{3x}-1}{\log(1+5x)}$

A. 1

B. 3/5

C. 1

D. none

Answer: B

Watch Video Solution

222. $\underset{x \to 1}{\text{Lt}} (\log_2 2x)^{\log_x 5} =$

A. $5/2$

B. $e^{\log_2 5}$

C. $e^{\log_e 2}$

D. $\log 5 / \log 2$

Answer: B

Watch Video Solution

223. $\underset{x \to 0}{\text{Lt}}\, x^x =$

A. 0

B. 1

C. e

D. $1/e$

Answer: B

Watch Video Solution

224. $\underset{x \to 0}{\text{Lt}}\, (\sin x)^{\tan x} =$

A. -1

B. 0

C. 1

D. ∞

Answer: C

Watch Video Solution

225. $\underset{x \to 0}{\text{Lt}} (x + \sin x)^{\tan x} =$

A. -1

B. 0

C. 1

D. 2

Answer: C

Watch Video Solution

226. $\underset{x \to 0}{\text{Lt}} \{(1 - x^2) \frac{1}{\log(1 - x)}$)=

A. e

B. e^2

C. e^3

D. e^4

Answer: A

View Text Solution

227. $\underset{x \to 1}{\text{Lt}} (1 - x)^{\tan \pi x} =$

A. -1

B. 0

C. 1

D. 2

Answer: C

Watch Video Solution

228. If $f(x) = \left(\frac{x}{2+x}\right)^{2x}$, then

A. $\underset{x \to \infty}{f(x)} = e^{-6}$

B. $\underset{x \to \infty}{f(x)} = 2$

C. $\underset{x \to \infty}{f(x)} = e^{-4}$

D. $\underset{x \to \infty}{f(x)} = 1/9$

Answer: C

Watch Video Solution

229. $\underset{x \to 0}{\text{Lt}} \left(\frac{\tan x}{x}\right)^{1/x^2} =$

A. e^2

B. $e^{1/2}$

C. $e^{-1/2}$

D. $e^{1/3}$

Answer: D

Watch Video Solution

230. $\underset{x \to 0}{\text{Lt}} \left(\frac{\sin x}{x} \right)^{\frac{\sin x}{x - \sin x}} =$

A. 0

B. 1

C. e

D. 1/e

Answer: D

Watch Video Solution

Watch Video Solution

231. $\underset{x \to 0}{\text{Lt}} (\sin x + \cos x)^{1/x} =$

A. e^{-1}

B. e

C. e^2

D. e^{-2}

Answer: B

Watch Video Solution

232. $\underset{x \to \frac{\pi}{2}}{\text{Lt}} \left(\frac{1 + \cos x}{1 - \cos x} \right)^{1/\cos x} =$

A. e

B. e^2

C. e^3`

D. e^4

Answer: B

Watch Video Solution

233. $\underset{x \to 0}{\text{Lt}} \left(\frac{1 + \tan x}{1 + \sin x} \right)^{1/x} =$

A. e^2

B. e^{-2}

C. e^6

D. 1

Answer: D

Watch Video Solution

234. $\underset{x \to 0}{\text{Lt}} \left(\frac{1 + \tan x}{1 + \sin x} \right)^{\text{cosec x}} =$

A. 1

B. e

C. e^{-1}

D. none

Answer: A

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Exercise 1B(One Sided Limits)

1. $\underset{x \to 0}{\text{Lt}} \sqrt{x} =$

A. 0

B. $\sqrt{2}$

C. $\sqrt{3}$

D. does not exist

Answer: A

Watch Video Solution

2. $\lim_{x \to 1} \sqrt{1 - x} =$

A. 0

B. $\sqrt{2}$

C. $\sqrt{3}$

D. does not exist

Answer: A

Watch Video Solution

3. $\lim_{x \to 2-} \sqrt{2 - x} =$

A. 0

B. $\sqrt{2}$

C. $\sqrt{3}$

D. does not exist

Answer: A

Watch Video Solution

4. $\underset{x \to 3+}{\text{Lt}} \sqrt{x-3} =$

A. 0

B. $\sqrt{2}$

C. $\sqrt{3}$

D. does not exist

Answer: A

Watch Video Solution

5. $\underset{x \to 2}{\text{Lt}} \sqrt{4 - x^2} =$

A. 0

B. $\sqrt{2}$

C. $\sqrt{3}$

D. does not exist

Answer: A

Watch Video Solution

6. $\underset{x \to 0}{\text{Lt}} |x| =$

A. 0

B. 1

C. -1

D. does not exist

Answer: A

Watch Video Solution

7. $\underset{x \to 1}{\text{Lt}} \frac{|x|}{x} =$

A. 0

B. 1

C. -1

D. does not exist

Answer: B

Watch Video Solution

8. $\underset{x \to -2}{\text{Lt}} \frac{|x|}{x} =$

A. 0

B. 1

C. -1

D. does not exist

Answer: C

Watch Video Solution

9. $\underset{x \to 3-}{\text{Lt}} \frac{|x-3|}{x-3} =$

A. 0

B. 1

C. -1

D. does not exist

Answer: C

Watch Video Solution

10. $\underset{x \to 0+}{\text{Lt}} \left\{ \frac{|x|}{x} + x^2 + 3 \right\} =$

A. 2

B. 3

C. 4

D. 6

Answer: C

Watch Video Solution

11. $\underset{x \to 0}{\text{Lt}} \frac{3|x| + x}{7|x| - 5x} =$

A. $3/2$

B. $3/10$

C. $1/8$

D. does not exist

Answer: D

Watch Video Solution

12. $\underset{x \to \infty}{\text{Lt}} \frac{3|x| + x}{7|x| - 5x} =$

A. 0

B. 1

C. 2

D. does not exist

Answer: C

Watch Video Solution

13. $\underset{x \to -\infty}{\text{Lt}} \frac{2|x| + x}{5|x| - 3x} =$

A. $3/2$

B. $3/10$

C. $1/8$

D. does not exist

Answer: C

Watch Video Solution

14. $\underset{x \to 0-}{\text{Lt}} \frac{5|x| + 2x}{7|x| - 3x} =$

A. $3/2$

B. $3/10$

C. $1/8$

D. does not exist

Answer: B

Watch Video Solution

15. $\underset{x \to 1}{\text{Lt}} \frac{x^2 - 1}{|x - 1|} =$

A. 2

B. -2

C. ∞

D. does not exist

Answer: D

Watch Video Solution

16. $\underset{x \to 0}{\text{Lt}} \frac{\sin x}{|x|} =$

A. 1

B. -1

C. 0

D. does not exist

Answer: D

Watch Video Solution

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

A. 1

B. -1

C. 0

D. does not exist

Answer: D

Watch Video Solution

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

A. 1

B. -1

C. 0

D. does not exist

Answer: A

Watch Video Solution

19. $\underset{x \to 0}{\text{Lt}} \frac{\sin x^2}{|x|} =$

A. 0

B. 1

C. -1

D. does not exist

Answer: A

Watch Video Solution

20. $\underset{x \to 2}{\text{Lt}} \left(\frac{\sqrt{1 - \cos\{2(x-2)\}}}{x-2} \right)$

A. equals $-\sqrt{2}$

B. equals $1/\sqrt{2}$

C. does not exist

D. equals $\sqrt{2}$

Answer: C

Watch Video Solution

21. $\underset{x \to 0}{\text{Lt}} \sin\left(\frac{1}{x}\right) =$

A. 0

B. 1

C. -1

D. does not exist

Answer: D

Watch Video Solution

22. $\underset{x \to 0}{\text{Lt}}\, x \sin\left(\frac{1}{x}\right) =$

A. 0

B. 1

C. does not exist

D. cannot be determine

Answer: A

Watch Video Solution

23. $\underset{x \to 0}{\text{Lt}}\, x \sin\left(\frac{1}{x}\right) =$

A. 0

B. 1

C. -1

D. does not exist

Answer: B

Watch Video Solution

24. $\underset{x \to 0}{\text{Lt}}\, x \sin\left[\frac{1}{x^2}\right] =$

A. 0

B. 1

C. -1

D. does not exist

Answer: A

Watch Video Solution

25. $\underset{x \to 0}{\text{Lt}}\, x^2 \sin(\pi / x) =$

A. 1

B. 0

C. does not exist

D. ∞

Answer: B

Watch Video Solution

26. $\underset{x \to 0}{\text{Lt}} \cos\left(\frac{1}{x}\right) =$

A. 0

B. 1

C. -1

D. does not exist

Answer: D

Watch Video Solution

27. $\underset{x \to 0}{\text{Lt}}\, x \cos\left(\frac{1}{x}\right) =$

A. 0

B. 1

C. -1

D. does not exist

Answer: A

Watch Video Solution

28. $\underset{x \to \pi/2}{\text{Lt}}\, \tan x$

A. 0

B. ∞

C. $-\infty$

D. does not exist

Answer: C

Watch Video Solution

29. $\underset{x \to 1-}{\text{Lt}} \left(\frac{|x|}{x} \right)$

A. 0

B. 1

C. -1

D. does not exist

Answer: C

Watch Video Solution

30. $\underset{x \to 3}{\text{Lt}} |x|$

A. 3

B. ∞

C. $-\infty$

D. does not exist

Answer: D

Watch Video Solution

31. $\underset{x \to \infty}{\text{Lt}} x \tan \frac{1}{x} =$

A. 0

B. 1

C. -1

D. does not exist

Answer: B

Watch Video Solution

32. $\underset{x \to 0}{\text{Lt}} \cot x =$

A. 0

B. ∞

C. $-\infty$

D. does not exist

Answer: B

Watch Video Solution

33. $\underset{x \to 0}{\text{Lt}} \cot x =$

A. 0

B. ∞

C. $-\infty$

D. does not exist

Answer: C

Watch Video Solution

34. $\underset{x \to \infty}{\text{Lt}} \sqrt{\frac{\{x - \sin x\}}{x + \cos^2(x)}} =$

A. 0

B. 1

C. -1

D. ∞

Answer: B

Watch Video Solution

35. $\underset{n \to \infty}{\text{Lt}} \frac{\sin n\theta}{\sqrt{n}} =$

A. 0

B. 1

C. -1

D. does not exist

Answer: A

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36. $\underset{x \to \pi/2}{\text{Lt}} \left(e^{-\tan\theta}\right) \sec^2\theta =$

A. -1

B. 0

C. 1

D. does not exist

Answer: D

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37. $\underset{x \to -\infty}{\text{Lt}} \dfrac{x^4 . \sin(1/x) + x^2}{1 + |x|^3} =$

A. 1

B. -1

C. 2

D. -3

Answer: B

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38. $\underset{x \to 0}{\text{Lt}} \dfrac{1}{x} =$

A. 0

B. ∞

C. $-\infty$

D. does not exist

Answer: D

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39. $\underset{x \to \infty}{\text{Lt}} \frac{1}{x} =$

A. 0

B. ∞

C. $-\infty$

D. does not exist

Answer: A

Watch Video Solution

40. $\underset{x \to 0}{\text{Lt}} \frac{1}{x^2} =$

A. 0

B. ∞

C. $-\infty$

D. does not exist

Answer: B

Watch Video Solution

41. $\underset{x \to \infty}{\text{Lt}} \frac{1}{x^2} =$

A. 0

B. ∞

C. $-\infty$

D. does not exist

Answer: A

Watch Video Solution

42. $\underset{x \to \infty}{\text{Lt}} \frac{1}{x^2} =$

A. 0

B. ∞

C. $-\infty$

D. does not exist

Answer: A

Watch Video Solution

43. $\underset{x \to 0}{\text{Lt}} e^{1/x} =$

A. 0

B. 1

C. -1

D. does not exist

Answer: D

Watch Video Solution

44. $\underset{x \to \infty}{\text{Lt}} \dfrac{e^{1/x} - e^{-1/x}}{e^{1/x} + e^{-1/x}} =$

A. -1

B. 1

C. 0

D. does not exist

Answer: C

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45. $\underset{x \to 0}{\text{Lt}} \frac{2^{1/x} - 1}{2^{1/x} + 1} =$

A. -1

B. 1

C. 0

D. ∞

Answer: B

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46. $\underset{x \to 3}{\text{Lt}} [x] =$

A. -1

B. 3

C. 8

D. does not exist

Answer: D

Watch Video Solution

47. $\underset{x \to 4+}{\text{Lt}} \{[x] + x\} =$

A. -1

B. 3

C. 8

D. does not exist

Answer: C

Watch Video Solution

48. $\underset{x \to 2-}{\text{Lt}} \{[x] + x\} =$

A. -1

B. 3

C. 8

D. does not exist

Answer: A

Watch Video Solution

49. $\underset{x \to 5+}{\text{Lt}}$ {x-[x]}=`

A. 0

B. $1/2$

C. $-1/2$

D. does not exist

Answer: A

View Text Solution

50. $\underset{x \to 0+}{\text{Lt}} [x] \sin \frac{1}{x} =$

A. 0

B. 1

C. -1

D. does not exist

Answer: A

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51. $\underset{x \to \pi/2}{\text{Lt}} [\sin x] =$

A. 1

B. 0

C. -1

D. none

Answer: B

View Text Solution

52. If $a > 0$ then underset(x to oo)"Lt" ([ax+b])/(x)=`

A. 0

B. 1

C. a

D. b

Answer: C

View Text Solution

53. $\underset{x \to \infty}{\text{Lt}} \frac{[x] + [2x] + [3x] + ... + [nx]}{n^2} =$

A. x/2

B. x/3

C. x

D. 0

Answer: A

View Text Solution

54. $\underset{x \to 0}{\text{Lt}} \dfrac{\left[1^2 x\right] + \left[2^2 x\right] + \left[3^2 x\right] + ... + \left[n^2 x\right]}{n^3} =$

A. x/2

B. x/3

C. x/6

D. 0

Answer: B

View Text Solution

55. $\underset{x \to 1}{\text{Lt}} \{1 - x + [x - 1] + [1 - x]\}$ is

A. 0

B. 1

C. -1

D. none

Answer: C

View Text Solution

56. $\underset{x \to 0}{\text{Lt}} \{1 - x + [x - 1\} + [1 - x]\}$ is

A. 0

B. 1

C. 2

D. 3

Answer: D

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57. If

$f: R \to R$ is defined by f(x) $= [x-3] + [x-4]$ for $x \in R$ then $\underset{x \to 3-}{\text{Lt}} f($

A. -2

B. -1

C. 0

D. 1

Answer: C

View Text Solution

58. If

$f(x) = \dfrac{\sin[x]}{[x]}$ at $[x] \neq 0$ and $f(x) = 0$ at $then$ underset(x to 0)$Ltf($

A. 0

B. 1

C. -1

D. does not exist

Answer: D

View Text Solution

59. If $f(x) = \begin{cases} \frac{\sin(1+[x])}{x} & \text{for } [x] \neq 0 \\ 0 & \text{for } [x]=0 \end{cases}$ where [x] denotes the greatest integer not exceeding x then $\underset{x \to 0-}{\text{Lt}} f(x) =$

A. -1

B. 0

C. 1

D. 2

Answer: B

View Text Solution

60. Let $f: R \to R$ be a positive increasing function with $\frac{f(3x)}{\underset{x \to \infty}{f(x)}} = 1$

A. 1

B. $2/3$

C. $3/2$

D. 3

Answer: A

View Text Solution

61. If $f(x) = \sqrt{9 - x^2}$ then $\underset{x \to 2}{\text{Lt}} \frac{f(x) - f(2)}{x - 2}$ is

A. $3/\sqrt{5}$

B. $-2/\sqrt{5}$

C. 0

D. none

Answer: B

Watch Video Solution

62. If $f(x) = -\sqrt{25 - x^2}$, then $\underset{x \to 1}{\text{Lt}} \dfrac{f(x) - f(1)}{x - 1} =$

A. $1/24$

B. $1/5$

C. $-\sqrt{24}$

D. $1/\sqrt{24}$

Answer: D

Watch Video Solution

63. If $f(x) = x\tan^{-1}x$ then $\underset{x\to 1}{\text{Lt}}\left(\frac{f(x-f(1))}{x-1}\right) =$

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

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

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

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

Answer: C

Watch Video Solution

64. If

$f:\mathbb{R}\to\mathbb{R}$ is defined by f(x) {{:(,(x-2)/(xˆ(2)-3x+2), if x in R-{1,2}),(

A. 0

B. -1

C. 1

D. $-1/2$

Answer: B

View Text Solution

65. If f(x)f(x),{{:(,x-5,"for x"le 1),(,4x^(2)-8,"for "1 lt x lt 2"then "f(2+)-f(2-)=),(,3x+4,"for "x ge 2):}" then " f(2+)-f(2-)=`

A. 0

B. 2

C. 3

D. 4

Answer: C

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66. If $f(x) = xf$ or $x < 0 = 0f$ or $x = 0$=x^(2)"for "x gt 0" then "underset(x to 0)"Lt" f(x)=`

A. -1

B. 0

C. 1

D. 2

Answer: B

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67. If $f(x) = \begin{cases} 2x + b & (x < a) \\ x + d & (x \geq a) \end{cases}$ is such that $\underset{x \to a}{\text{Lt}} f(x) = l$ then l=

A. 2d-b

B. 2b-d

C. 2d+b

D. b-2d

Answer: A

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68. If

$$f(x) = \begin{cases} \sin x & x \neq n\pi \quad n \in Z \\ 2 & \text{otherwise} \end{cases} \text{ and } g(x) = \begin{cases} x^2 + 1 & x \neq 0,2 \\ 4 & x = 0 \\ 5 & x = 2 \end{cases} \text{ t}$$

A. 2

B. 4

C. 5

D. 1

Answer: D

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69. If $f(x) = \begin{cases} 1 & (x < 0) \\ 2x + 1 & (x \leq 1) \\ 3x & (x > 1) \end{cases}$ then $\underset{x \to 1}{\text{Lt}} f(x) =$

A. 2

B. 0

C. 3

D. `-1

Answer: C

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70. $f(x) = \begin{cases} x + 2 & (1 < \leq 2) \\ x^2 & (2 < x < 5) \end{cases}$ then $\underset{x \to 2}{\text{Lt}} f(x) =$

A. 2

B. 4

C. 3

D. -1

Answer: B

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71. If $f(x) = \begin{cases} x/2 & (x < 2) \\ x^2/3 & (x \geq 2) \end{cases}$ then $\underset{x \to 2+}{\text{Lt}} f(x) =$

A. 1

B. $4/3$

C. 3

D. `-1

Answer: B

View Text Solution

Exercise 1C(Continuity)

1. The function $f(x) = \tan x \quad \text{for} \quad x \neq \pi/2, f(\pi/2) = 0 \quad \text{at} \quad x = \pi/2 \quad \text{is}$

A. continuous

B. discontinuous

C. not determined

D. none

Answer: B

View Text Solution

2. The function $f(x) = \dfrac{\sin^2 x}{x} \quad \text{for} \quad x \neq 0, f(0) = 1 \quad \text{at} \quad x = 0 is$

A. continuous

B. discontinuous

C. not determined

D. none

Answer: B

View Text Solution

3. The function $f(x) = \frac{\tan x}{x}$ for $x \neq 0, f(0) = 1$ at $x = 0 is$

A. continuous

B. discontinuous

C. not determined

D. none

Answer: C

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4. If $f(x) = \frac{|x|}{x}$ for $x \neq 0, f(0) = 0,$ then f(x) at x=0 is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: B

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5. The function $f(x) = \sqrt{x}$ at $x=0$ is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: A

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6. The function $f(x) = \sqrt{x}$ at x=0 is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: A

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7. The function $f(x) = x + [x]$ at $x = 1/2$ is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: A

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8. The function $f(x) = x + [x]$ at $x = 1/2$ is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: A

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9. The function $f(x) = x - [x]$ when x=2 is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: B

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10. The function $f(x) = (1+x)^{5/x}$, $f(0) = e^5$ at x $=0$ is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: A

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11. The function $f(x) = \frac{x \tan 2x}{\sin 3x \sin 5x}$ for $x \neq 0, f(0) = 2/17$. At x=0 is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: B

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12. The function $f(x) = \frac{\cos 3x - \cos 4x}{x \sin 2x}$ for $x \neq 0, f(0) = 7/4$ at x =0 is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: A

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13. The function $f(x) = \frac{1 - \cos x}{x^2}$ for $x \neq 0, f(0) = 1$ at x=0 is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: A

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14. The function $f(x) = \dfrac{3\sin x - \sin 3x}{x^3}$ for $x \neq 0, f(0) = 1$ at x=0 is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: B

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15. The function $f(x) = \dfrac{1 - \cos ax}{1 - \cos bx}$ for $x \neq 0, f(0) = \dfrac{a}{b}$ at $x = 0$ is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: B

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16. The function $f(x) = \left(\sqrt{1+x^2} - \frac{\sqrt{1-x^2}}{x^2} \text{for} \quad x \neq 0, f(0) = 1 at x = 0 is \right.$

A. continuous

B. discontinuous

C. not determined

D. none

Answer: B

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17. The function $f(x) = \frac{\sqrt{x^2+3}-2}{x-1} \text{for} \quad x \neq 1, f(1) = 1/2 \quad \text{at x=1 is}$

A. continuous

B. discontinuous

C. not determined

D. none

Answer: A

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18. The function $f(x) = \frac{7|x| + 5x}{7|x| - 5x} f \text{ or } x \neq 0, f(0) = 6 \text{ at x} = 0 \text{ is}$

A. continuous

B. discontinuous

C. not determined

D. none

Answer: B

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19. If $f(x) = \dfrac{1}{3^{1/x}+1}$, then at x=0, f(x) is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: B

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20. The function $f(x) = \left[\dfrac{x-1}{1+e^{\frac{1}{x-1}}}\right]$ for $x \neq 1, f(1) = 0$ at x=1 is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: A

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21. The function $f(x) = \left(\frac{e^{1/x^2}}{e^{1/x^2} - 1} \right.$ for $x \neq 0, f(0) = 1$ at x $=0$ is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: A

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22. $f(x) = (x - [x])\sin\left(\frac{1}{X}\right)$, at x = 0, f is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: B

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23. If $f(x) = x\sin\frac{1}{x}$ for $x \neq 0, f(0) = 0$ then at $x = 0, f(x) is$

A. continuous

B. discontinuous

C. not determined

D. none

Answer: A

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24. If $f(x) = x \cos \frac{1}{x^2}$ for $x \neq 0, f(0) = 1$ then at x=0, f(x) is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: B

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25. If $f(x) = \frac{x}{1 + e^{1/x}}$ for $x \neq 0, f(0) = 0$ then at x=0, f(x) is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: A

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26. The function $f(x) = \frac{xe^{1/x}}{1+e^{1/x}} + \sin\frac{1}{x}$ for $x \neq 0, f(0) = 0 at x = 0 is$

A. continuous

B. discontinuous

C. not determined

D. none

Answer: B

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27. If $f(x) = \frac{e^{1/x} - 1}{e^{1/x} + 1}$ for $x \neq 0, f(0) = 0$ then at x=0, f(x) is

A. continuous

B. discontinuous

C. not determined

D. none

Answer: B

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28. If $f(x) = \frac{\sin^2 ax}{x^2}$ for $x \neq 0, f(0) = 1$ is continuous at x=0 then a=

A. 0

B. 1

C. ± 1

D. 2

Answer: C

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29. if $f(x) = \frac{1 - \cos ax}{x \sin x}$ for $x \neq 0, f(0) = 1/2$ is continuous at x=0 then a=

A. 0

B. 1

C. ± 1

D. 2

Answer: C

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30. A function f is defined by

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

It f(x) is continuous at x = 0 , find the values of a,b and c .

A. 1

B. 2

C. $3/2$

D. $-3/2$

Answer: D

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31. f(x)= |x| is

A. everywhere continuous

B. continuous only at 0

C. discontinuous at x=0

D. nowhere continuous

Answer: A

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32. If $f(x) = x^2, \quad \text{for x rational}$

$= \ -x^2, \text{for x irrational, then}$

A. f is continuous at x=0 and x=1/2

B. f is discontinuous at x=0 and x=1/2

C. f is continuous at x=0 and discontinuous at x=1/2

D. f is discontinuous at x=0 and continuous at x=1/2

Answer: C

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33. If $f(x) = \frac{\tan^{-1}(x+2)}{|x+2|}, x \neq -2$ and $f(-2) = 2$then

A. f is continuous at -2

B. f is not continuous at -2

C. $\underset{x \to -2}{\text{Lt}} f(x) = 1$

D. none

Answer: B

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34. f(x)=1 for x is rational f(x)=-1 for x irrational, f is continuous on

A. R

B. ϕ

C. $(-1, 1)$

D. none

Answer: B

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35. If $a < b$ then f(x) =sqrt ((x-a)/(b-x))` is continuous on

A. (a,b)

B. [a,b]

C. [a,b)

D. (a,b]

Answer: C

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36. The function $f(x) = \left\{ \begin{array}{ll} 3x-1 & \text{if } x < 1 \\ x^2 & \text{if } x > 2 \end{array} \right\}$ is continous

A. $(-\infty, 1)$

B. $(2, \infty)$

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

D. (1,2)

Answer: C

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37. If $f: \mathbb{R} \to \mathbb{R}$ is defined by $f(x) = \begin{cases} \frac{x+2}{x^2+3x+2} & \text{if } x \in R - \{-1, -2\} \\ -1 & \text{if } x = -2 \\ 1 & \text{if } x = -1 \end{cases}$ then is a continuous on the set

A. R

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

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

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

Answer: C

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38. Let 'f' be a non-zero real valued continuous function satisfying f(x + y) = f(x), f(y) . f(y) for all $x, y \in R$ if f(2) = 9 , then f(6) =

A. 3^2

B. 3^6

C. 3^4

D. 3^3

Answer: B

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39. If f(x+y)=f(x) f(y) and $f(x) = 1 + g(x), h(x)$ where $\underset{x \to 0}{\text{Lt}}\, g(x) = \underset{x \to 0}{\text{Lt}}\, h(x)$ exists, then f(x) is co

A. ϕ

B. R

C. $R - \{0\}$

D. $R - \{1\}$

Answer: B

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40. Let f(x)=f(x) f(y) for all x and y. If f(x) is continuous at x=1. then f(x) is continuous

A. ϕ

B. R

C. $R - \{0\}$

D. $R - \{1\}$

Answer: B

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41. A discontinuous function y=f(x) satisfying $x^2 + y^2 = 4$ is given by f(x)=

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

B. $f(x) = \sqrt{4 + x^2}$

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

D. none

Answer: A

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42. The discontinuous points of $f(x) = \frac{1}{\log|x|}$ are

A. $0, \pm 2$

B. $1, \pm 2$

C. $0, \pm 1$

D. $0, \pm 3$

Answer: C

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43. If f : R $\rightarrow$ R is defind by f (x) = x - [x], where [x] , is the greatest integer not exceding x , then the set of discontinuous of f is

A. the empty set

B. R

C. Z

D. N

Answer: C

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44. If $f: R \to R$ is a continuous defined by $f(x) = [x]\cos\left(\frac{2x-1}{2}\right)\pi$, where [x] denotes the greatest integer function, then f is

A. discontinuous only at non-zero integral values of x

B. continuous only at y

C. continuous only at x

D. discontinuous only

Answer: C

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45. $f(x) = \sqrt{x - [x]}$ is discontinuous at

A. square of integers

B. every integer

C. every non integer

D. none

Answer: B

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46. The value of f(0) so that $f(x) = (1+x)^{5/x}$ is continuous at x=0 is

A. e^2

B. e^3

C. $e^{3/2}$

D. e^5

Answer: D

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47. The value of f(0) so that $f(x) = \frac{\sin x}{x}$ is continuous at x=0 is

A. 1

B. 2

C. 3

D. $3/2$

Answer: A

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48. The value of f(0) so that $f(x) = \frac{3x + 4\tan x}{x}$ is continuous at x=3 is

A. $3/2$

B. 2

C. 3

D. 7

Answer: D

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49. The value of f(0) so that $f(x) = \frac{3x + 4\tan x}{x}$ is continuous at x=0 is

A. 5

B. 6

C. 7

D. none

Answer: C

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50. The value of f(0) so that $f(x) = \frac{\sqrt{1+x} - 1}{x}$ is continuous at x=0 is

A. 1

B. 2

C. $1/2$

D. 3

Answer: C

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51. If $f(x) = x^{\frac{1}{x-1}}$ for $x \neq 1$ and if f is continuous at x=1 then f(1)=

A. 0

B. 1

C. e

D. $1/e$

Answer: C

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52. The value of f(0) so that the function $f(x) = \frac{(27-2x)^{1/3}-3}{9-3(243+5x)^{1/5}}$ is continuous at x=0 is

A. $2/3$

B. 6

C. 2

D. none

Answer: C

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

A. 0

B. e

C. 1/e

D. none

Answer: B

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54. The value of f(00) so that the function $f(x) = \frac{2x - \sin^{-1} x}{2x + \tan^{-1} x}$ is continuous at x=0, is

A. 2

B. $1/3$

C. $2/3$

D. $-1/3$

Answer: B

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55. The value of f(0) so that the function $f(x) = \frac{\sqrt{1+x} - \sqrt[3]{1+x}}{x}$ becomes continuous at x=0 is

A. $1/6$

B. $1/4$

C. 2

D. $1/3$

Answer: A

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

A. 2

B. 4

C. -2

D. -4

Answer: D

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57. Extend the definition of the following by continuity $f(x) = \frac{1 - \cos 7(x - \pi)}{5(x - \pi)^2}$ at the pointx=π

A. 0

B. 1

C. π

D. $\pi / 2$

Answer: A

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58. Let $f(x) = \frac{1 - \tan x}{4x - \pi}, x \neq \frac{\pi}{4}, x \in \left[0, \frac{\pi}{2}\right]$. If f(x) is continuous in $\left[0, \frac{\pi}{4}\right]$,

A. 1

B. -1

C. $-1/2$

D. $1/2$

Answer: C

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59. $f(x) = \begin{cases} \frac{1-\sqrt{2}\sin x}{\pi - 4x} & \text{if } x \neq \frac{\pi}{4} \\ \text{k} & \text{if } x = \frac{\pi}{4} \end{cases}$

continous at x=(pi)/(4)`, then K=

A. 4

B. 2

C. 1

D. $1/4$

Answer: D

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60. If $f: R \to R$ is defined by $f(x) = \begin{cases} \frac{1+3x^2-\cos 2x}{x^2} & \text{for } x \neq 0 \\ k & \text{for x=0} \end{cases}$

A. 1

B. 5

C. 6

D. 0

Answer: B

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61. If $f: R \to R$ is defined by $f(x) = \begin{cases} \frac{\cos 3x - \cos x}{x^2} & \text{for } x \neq 0 \\ \lambda & \text{for } x = 0 \end{cases}$ and if f is continuous at x=0, then $\lambda =$

A. -2

B. -4

C. -6

D. -8

Answer: B

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62. If $fR \to R$ is defined by $f(x) = \begin{cases} \frac{2\sin x - \sin 2x}{2x\cos x} & \text{if } x \neq 0 \\ \alpha & \text{for } x = 0 \end{cases}$ then the value of ` alpha so that f is continuous at 0 is

A. 2

B. 1

C. -1

D. 0

Answer: D

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63. The value of f(0) so that the function $f(x) = \frac{1 - \cos(1 - \cos x)}{x^4}$ is continuous every-where is

A. $1/8$

B. $1/2$

C. $1/4$

D. none

Answer: A

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64. Find the value of AO) so that the function f(x) = $\frac{(a + x)^2 \sin(a + x) - a^2 \sin a}{x}$ is continuous at x = 0.

A. $a^2 \cos a + a \sin a$

B. $a^2 \cos a + 2a \sin a$

C. $2a^2 + \cos a + a \sin a$

D. none

Answer: B

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65. The value of f(2) so that $f(x) = \frac{2^{x+2} - 16}{4^x - 16}$ is continuous at x=2 is

A. 2

B. $1/2$

C. -2

D. $-1/2$

Answer: B

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66. If the function $f(x) = \dfrac{\log(1+ax) - \log(1-bx)}{x}$ is continuous at x=0, then f(0)=

A. a-b

B. a+b

C. loga+ log b

D. loga-logb

Answer: B

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67. The value of f(0) so that $f(x) = \dfrac{\log(1+x/a) - \log(1-x/b)}{x}$ is continuous at x=0 is

A. $\dfrac{a+b}{ab}$

B. $(a-b)$

C. $\dfrac{ab}{a+b}$

D. $\frac{ab}{a-b}$

Answer: A

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68. Let $f(x) = \left(\log\left(1+x+x^2\right) + \frac{\log\left(1-x+x^2\right)}{\sec x - \cos x}, x \neq 0\right.$. Then the value of f(0) so that f is continuos at x=0 is

A. 1

B. 0

C. 2

D. none

Answer: A

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69. The value of f(0) so that $f(x)=\frac{\left(4^{x}-1\right)^{3}}{\sin(x/4)\log(1+x^{2}/3)}$ is continuous everywhere 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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70. If $f(x)=\frac{\left(a^{x}-1\right)^{3}}{\sin(x\log a)\log\left(1+x^{2}\log a^{2}\right)}$ is continuous at x=0 , then f(0)=

A. log a

B. 2 log a

C. $\log a^{-1}$

D. $\log \sqrt{a}$

Answer: D

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71. If If $\begin{cases} \frac{72^x - 9^x - 8^x + 1}{\sqrt{2} - \sqrt{1 + \cos x}} & x \neq 0 \\ k \log 2 \log 3 & x = 0 \end{cases}$ is a continuous function then k is equal to

A. $\sqrt{2}$

B. 24

C. $18\sqrt{3}$

D. $24\sqrt{2}$

Answer: D

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72. If $f: R \to R$ is continuous such that

$f(x+y) = f(x) + f(y) x \in R, y \in R$ and

f(1) = 2 then f(100) =

A. 100

B. 50

C. 200

D. 0

Answer: C

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73. Let f be a non zero continuous function satisfying f(x+y)=f(x) f(y) for all $x, y \in R$. If f(2)=9 then f(3) is

A. 1

B. 27

C. 200

D. 0

Answer: B

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74. Given that the function f defined by $f(x) = \begin{cases} 2x-1 & \text{if } x > 2 \\ k & \text{if x=2} \\ x^2-1 & \text{if } x < 2 \end{cases}$ is continuous. Then the value of k is

A. 2

B. 3

C. 4

D. -3

Answer: B

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75. $f(x) = \dfrac{x^3 + x^2 - 16x + 20}{(x-2)^2}$ if $x \neq 2, = k$ if x = 2 , f(x) is continuous at x = 2 then

A. 5

B. 7

C. 11

D. 15

Answer: B

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76. If $f(x) = \dfrac{x^2 - 10x + 25}{x^2 - 7x + 10}$ for $x \neq 5$ and f is continuous at x=5 then f(5)=

A. 0

B. 5

C. 10

D. 25

Answer: A

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77. Let $f(x) = \frac{x + x^2 + \ldots + x^n - n}{x - 1}, x \neq 1$, the value of f (1)

A. n

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

C. $\frac{n(n+1)}{2}$

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

Answer: C

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78. If the function $f(x) = \frac{\sin 3x}{x}$ for $x \neq 0$ and $f(0) = \frac{k}{2}$ is continuous at x=0 then k=

A. 3

B. 6

C. 9

D. 12

Answer: B

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

A. -4

B. -3

C. -2

D. -1

Answer: C

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80. If : $[-2, 2] \to R$ is defined by

$$f(x) = \begin{cases} \frac{\sqrt{1+cx}-\sqrt{1-cx}}{x} & \text{for} -2 \leq x < 0 \\ \frac{x+3}{x+1} & \text{for} \quad 0 \leq x \leq 2 \end{cases}$$

continuous on [-2, 2] then c is equal to

A. 3

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

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

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

Answer: B

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81. Let f(x)=-2 sin x, if $x \leq \frac{-\pi}{2}, f(x) = a\sin x + b,$ if $\frac{-\pi}{2}, f(x) = a\sin x + b,$ if $\left(-\pi/(2)\right.$. The value of d and b so that f(x) is continuous everywhere are

A. a=0,b=1

B. a=-1,b=1

C. a=-1,b=0

D. a=-1,b=1

Answer: D

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82. If [x] denotes the greatest integer not exceeding x and if the function f defined by $f(x) = \begin{cases} \frac{a+2\cos x}{x^2} & x < 0 \\ b\tan\frac{\pi}{x+4} & x \geq 0 \end{cases}$ is continuous at x = 0, then the ordered pair (a,b) is equal to

A. (-2,1)

B. (-2,-1)

C. $(-1, \sqrt{3})$

D. $(-2, -\sqrt{3})$

Answer: B

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83. The values of p and q for which the function

$$f(x) = \begin{cases} \frac{\sin(p+1)x + \sin x}{x} & x < 0 \\ \frac{q^{x} + \sqrt[2]{-\sqrt{x}}}{x^{3/2}} & x > 0 \end{cases}$$

is continuous for all x in R, are

A. $p = \frac{3}{2}, q = \frac{1}{2}$

B. $p = \frac{1}{2}, q = \frac{3}{2}$

C. $p = \frac{1}{2}, q = -\frac{3}{2}$

D. $p = \frac{5}{2}, q = \frac{1}{2}$

Answer: A

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84. Let $f: R \to R$ is defined by f(x)= {{:(,alpha+(sin [x])/(x),if x gt 0),(,2,if x =0),(,beta+[(sin x-x)/(x^(3))], if x lt 0):} $where [y] de \neg esthe \int egralpartofy. If fiscont \in uousatx = 0, then$ beta-alpha=`

A. -1

B. 1

C. 0

D. 2

Answer: B

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85. If R $\rightarrow$ R b e defined f(x)=$\begin{cases} a^2\cos^2 x + b^2\sin^2 x & \text{if } x \leq 0 \\ e^{ax+b} & \text{if } x > 0 \end{cases}$ is a continuous function show that

A. b=2 log |a|

B. 2b=log |a|

C. b=log |2a|

D. $b^2 = \log|a|$

Answer: A

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86. $f: R - \{0\} \rightarrow R$ given by $f(x) = \frac{1}{x} - \frac{2}{e^{2x}-1}$ can be made continuous at x = 0 by defining f(0) as

A. 2

B. -1

C. 0

D. 1

Answer: D

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Exercise 2(Special Type Questions)

1. I. $\lim_{x \to 0} \frac{(1+x)^2 - (1-x)^2 - 2}{(1+x)^3 - (1-x)^3 - 3}$

II. If $f(x) = \frac{4 - 7x}{3x + 4}$ and $\lim_{x \to 2} f(x) = l$, $\lim_{x \to 0} f(x) = m$ then the equation whose roots are 1/l, $1/m$ is $x^2 - 1 = 0$

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: C

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2. $\underset{x \to 0}{\text{Lt}}\, x \sin\left(\frac{1}{x}\right) =$

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: B

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3. I. If $a > 0$ then $\underset{x \to \infty}{\text{Lt}} \frac{[ax + b]}{x} = a$

II. $\underset{x \to \pi/2}{\text{Lt}} [\sin x] =$

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: C

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4. I. $\underset{x \to 0}{\text{Lt}} \sqrt{s}$ does not exist

II. $\underset{x \to 1}{\text{Lt}} \frac{|x|}{x}$ does not exist.

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: D

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5. I. $\underset{x \to 0}{\text{Lt}} \dfrac{\log_e(1+x)}{3^x - 1} = \log_3 e$

II. $\underset{x \to 1}{\text{Lt}} (\log_5 5x)^{\log_x 5} = e$

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: C

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6. $\lim_{n \to \infty} \dfrac{1.1! + 2.2! + 3.3! + \ldots + n.\, n!}{(n+1)!} =$

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: C

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7. I. The function $f(x) = \sqrt{x}$ is continuous at x=0

II. The function $f(x) = |x|$ is continuous at x=0.

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: C

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8. The function $f(x) = \frac{1 - \cos ax}{1 - \cos bx}$ for $x \neq 0, f(0) = \frac{a}{b}$ at x= 0 is

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: B

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9. I. $\underset{x \to \infty}{\text{Lt}} \frac{\sin x}{x} = 1$

II. Every identify function is continuous on R.

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: B

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10. I. $\underset{\theta \to 0}{\text{Lt}} \frac{\sin(\theta^2)}{\theta} = \frac{\pi}{200}$

II. $f(x) = x^2 \sin(1/x)(x \neq 0)$ is a continuous at x=0

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: C

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SET-3Match The Following

1. Match the following

I. $f(x) = \frac{7\lvert x\rvert + 5x}{7\lvert x\rvert - 5x}$ for $x \neq 0, f(0) = 6$ at $x = 0$ is	a) continuous
II. $f(x) = \frac{\cos 3x - \cos 4x}{x \sin 2x}$ for $x \neq 0, f(0) = \frac{7}{4}$ at $x = 0$ is	b) discontinuous
III. If $f(x) = \frac{\sin^2 ax}{x^2}$ for $x = 0, f(0) = 4$ is continuous at $x = 0$ then $a =$	c) ± 1
IV. If $f(x) = \frac{1 - \cos ax}{x \sin x}$ for $x = 0, f(0) = 1/2$ is continuous at $x = 0$ then $a =$	d) ± 2

A. a,b,c,d

B. c,b,d,a

C. b,a,d,c

D. a,b,d,c

Answer: B

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2. Match the following

I. If $f(x) = \frac{\log(1+ax) - \log(1-bx)}{x}$ is continuous at $x = 0$ then $f(0) =$	a) 1
II. If $f(x) = \frac{\log(1+x/a) - \log(1-x/b)}{x}$ is continuous at $x = 0$ then $f(0) =$	b) $a+b$
III. If $f(x) = \frac{\log(1+x+x^2) + \log(1-x+x^2)}{\sec x - \cos x}$ is continuous at $x = 0$ then $f(0) =$	c) $\frac{a+b}{ab}$
	d) 0

A. a,c,b

B. b,c,a

C. d,c,b

D. c,d,a

Answer: A

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Set -4

1. Assertion (A) : $Lt_{x \to 0} \frac{|x|}{x} = 1$

Reason (R) : Limit of a function doesn't exist if left and right limits exists and are not equal the correct answer is

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true and R is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: D

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2. A: $\lim_{x \to 0} \left(\frac{\sin(x^2)}{x} = \frac{\pi}{200} \right.$

R: $\lim_{x \to 0} \frac{\sin(ax)}{x} = a$ if x is measured in radains

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true and R is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: A

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3. A: $\underset{x \to \pi/2}{\text{Lt}} \left(\frac{\cot x}{\pi/2 - x} \right) = 1$

R: If $\underset{x \to a}{\text{Lt}}\, \text{f(x)}$ exists, then $\underset{x \to a}{\text{Lt}} f(x) = \underset{x \to 0}{\text{Lt}} f(a + x) = \underset{x \to a}{\text{Lt}} f(a - x)$

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true and R is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: A

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4. A: $\underset{x \to \infty}{\text{Lt}}\, x \sin \frac{1}{x} = 0$

R: If $\underset{x \to a}{\text{lt}}\, f(x) = 0$ and g(x) is bounded on a deleted neighbourhood ofa

then $\underset{x \to a}{\text{Lt}}\, f(x)g(x) = 0$

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true and R is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: A

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5. Show that the function $f(x) = \frac{x}{1 + e^{1/x}, x \neq 0, f(0) = 0}$ is continuous at x = 0

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true and R is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: A

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6. A: f(x)=x-[x] is discontinuous at x=2

R: $\underset{x \to a}{\text{Lt}} f(x) = f(a)$

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true and R is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: B

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7. A: $f(x) = \frac{1}{1+e^{1/x}} (x \neq 0)$ and $f(0) = 0$ is right continuous at x=0

R: $\lim_{x \to 0} \frac{1}{1+e^{1/x}} = 0$

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true and R is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

Answer: A

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8. Let $f: R \to R$ be a continuous function defined by $f(x) = \frac{1}{e^x + 2e^{-x}}$

Statement -1 : $f(x) = \frac{1}{3}$, for some $c \in R$.

Statement -2, $0 < f(x) \leq \frac{1}{2\sqrt{2}} \forall x \in R$.

A. Statement-1 is true, Statement-2 is true, Statement -2 is a correct explanation for statement-1

B. Statement-1 is true, Statement-2 is true, Statement -2 is not a correct explanation for statement-1

C. Statement-1 is true, Statement-2 is false

D. Statement-1 is false, Statement- is true

Answer: A

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