



MATHS

BOOKS - RD SHARMA MATHS (ENGLISH)

LIMITS

Others

1. Suppose $f(x) = \begin{cases} a + bx & x < 1 \\ 4 & x = 1 \\ b - ax & x > 1 \end{cases}$ and if $\lim_{x \rightarrow 1} f(x) = f(1)$, what are

the values of a and b ?



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2. Find the left hand and right hand limits of greatest integer function $f(x) = [x]$ = greatest integer less than or equal to x , at $x = k$, where k is an integer.



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3. Prove that $\lim_{x \rightarrow a^+} [x] = [a]$ for all $a \in \mathbb{R}$, where $[*]$ denotes the greatest integer



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4. If f is an even function, then prove that $\lim_{x \rightarrow 0^-} f(x) = \lim_{x \rightarrow 0^+} f(x)$



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5. Show that $(\lim)_{x \rightarrow 0} \frac{x}{|x|}$ does not exist.



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6. Find k so that $(\lim)_{x \rightarrow 2} f(x)$ may exist, where $f(x) = \{2x + 3, x \leq 2$ and $x + k, x > 2$

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7. Show that $(\lim)_{x \rightarrow 0} \frac{1}{x}$ does not exist.

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8. Let $f(x) = \{x + 1, \text{ if } x > 0, \text{ and } x - 1, \text{ if } x < 0$. Prove that $(\lim)_{x \rightarrow 1} f(x)$ does not exist.

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9. Let $f(x) = \{x + 5, \text{ if } x > 0 \text{ and } x - 4, \text{ if } x < 0$ Prove that $(\lim)_{x \rightarrow 0} f(x)$ does not exist.

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10.

Find

$(\lim)_{x \rightarrow 3} f(x)$ where $f(x) = \begin{cases} 4, & \text{if } x > 3 \\ x + 1, & \text{if } x < 3 \end{cases}$

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11.

Find

$\lim_{x \rightarrow 0} f(x)$ and $(\lim)_{x \rightarrow 1} f(x)$, where $f(x) = \begin{cases} 2x + 3, & x \leq 0 \\ 3(x + 1), & x > 0 \end{cases}$

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12. Find $(\lim)_{x \rightarrow 1} f(x)$, where $f(x) = \begin{cases} x^2 - 1, & x \leq 1 \\ 1 - x^2, & x > 1 \end{cases}$

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13. Evaluate $(\lim)_{x \rightarrow 0} f(x)$, where $f(x) = \begin{cases} \frac{|x|}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$

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14. Find $(\lim)_{x \rightarrow 1^+} \frac{1}{x - 1}$.

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15. Evaluate the following one sided limit: $(\lim)_{x \rightarrow 2^-} \frac{x - 3}{x^2 - 4}$

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16. Evaluate the following one sided limit: $\lim_{x \rightarrow -8^+} \frac{2x}{x + 8}$

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17. Evaluate the following one sided limit: $(\lim)_{x \rightarrow \pi/2^+} \sec x$

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18. Evaluate the following one sided limit: $(\lim)_{x \rightarrow -\pi/2^+} (2 - \cot x)$



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19. Evaluate the following one sided limit: $(\lim)_{x \rightarrow 2^+} \frac{x - 3}{x^2 - 4}$



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20. Evaluate the following one sided limit: $(\lim)_{x \rightarrow 0^+} \frac{2}{x^{1/5}}$



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21. Evaluate the following one sided limit: $(\lim)_{x \rightarrow 0^-} \frac{x^2 - 3x + 2}{x^3 - 2x^2}$



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22. Evaluate the following one sided limit: $(\lim)_{x \rightarrow 0^-} 1 + \cos ec x$



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23. Evaluate the following one sided limit: $(\lim)_{x \rightarrow 0^+} \frac{1}{3x}$

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24. Evaluate the following one sided limit: $(\lim)_{x \rightarrow \frac{\pi}{2}^-} \tan x$

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25. Evaluate the following one sided limit: $(\lim)_{x \rightarrow -2^+} \frac{x^2 - 1}{2x + 4}$

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26. Show that $(\lim)_{x \rightarrow 0} e^{-1/x}$ does not exist.

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27. Find : $(\lim)_{x \rightarrow 2} [x]$



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28. Find : $(\lim)_{x \rightarrow \frac{5}{2}} [x]$



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29. Find : $(\lim)_{x \rightarrow 1} [x]$



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30. Find : $(\lim)_{x \rightarrow 3^+} \frac{x}{[x]}$. Is it equal to : $(\lim)_{x \rightarrow 3^-} \frac{x}{[x]}$



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31. Find : $(\lim)_{x \rightarrow -5/2} [x]$.



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32. Evaluate: $(\lim)_{x \rightarrow 1} 3x^2 + 4x + 5$

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33. Evaluate : $(\lim)_{x \rightarrow 0} \frac{\sqrt{1+x} + \sqrt{1-x}}{1+x}$

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34. Evaluate the following limit: $(\lim)_{x \rightarrow 1} \frac{x^2 + 1}{x + 1}$

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35. Evaluate the following limit: $(\lim)_{x \rightarrow 1} \frac{\sqrt{x+8}}{\sqrt{x}}$

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36. Evaluate the following limit: $(\lim)_{x \rightarrow -1} (4x^2 + 2)$



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37. Evaluate the following limit: $(\lim)_{x \rightarrow 3} \frac{x^2 - 2}{x + 2}$



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38. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{2x^2 + 3x + 4}{x^2 + 3x + 2}$



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39. Evaluate the following limit: $(\lim)_{x \rightarrow a} \frac{\sqrt{x} + \sqrt{a}}{x + a}$



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40. Evaluate the following limit: $(\lim)_{x \rightarrow 0} 9$



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41. Evaluate the following limit: $(\lim)_{x \rightarrow -1} \frac{x^3 - 3x + 1}{x - 1}$

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42. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{ax + b}{cx + d}, d \neq 0$

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43. Evaluate the following limit: $(\lim)_{x \rightarrow 3} \frac{\sqrt{2x + 3}}{x + 3}$

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44. Evaluate the following limit: $(\lim)_{x \rightarrow 1} \frac{1 + (x - 1)^2}{1 + x^2}$

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45. Evaluate the following limit: $(\lim)_{x \rightarrow 2} (3 - x)$



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46. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{3x + 1}{x + 3}$



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47. Evaluate: $(\lim)_{x \rightarrow 2} \frac{x^3 - 6x^2 + 11x - 6}{x^2 - 6x + 8}$



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48. Evaluate : $(\lim)_{x \rightarrow 1} \left(\frac{2}{1 - x^2} + \frac{1}{x - 1} \right)$



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49. Evaluate: $(\lim)_{x \rightarrow \sqrt{2}} \frac{x^9 - 3x^8 + x^6 - 9x^4 - 4x^2 - 16x + 84}{x^5 - 3x^4 - 4x + 12}$



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50. Evaluate the following limit: $\lim_{x \rightarrow -5} \frac{2x^2 + 9x - 5}{x + 5}$

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51. Evaluate the following limit: $(\lim)_{x \rightarrow 3} \frac{x^4 - 81}{x^2 - 9}$

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52. Evaluate the following limit: $(\lim)_{x \rightarrow -1/2} \frac{8x^3 + 1}{2x + 1}$

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53. Evaluate the following limit: $(\lim)_{x \rightarrow 2} \frac{x^4 - 16}{x - 2}$

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54. Evaluate the following limit: $\left(\lim \right)_{x \rightarrow \sqrt{2}} \frac{x^2 - 2}{x^2 + \sqrt{2}x - 4}$

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55. Evaluate the following limit: $\left(\lim \right)_{x \rightarrow \sqrt{3}} \frac{x^4 - 9}{x^2 + 4\sqrt{3}x - 15}$

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56. Evaluate the following limit:

$$\lim_{x \rightarrow 1} \left(\frac{1}{x^2 + x - 2} - \frac{x}{x^3 - 1} \right)$$

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

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

C. $-\frac{1}{9}$

D. $\frac{1}{9}$

Answer: C

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57. Evaluate the following limit: $(\lim)_{x \rightarrow 2} \left(\frac{1}{x-2} - \frac{2}{x^2-2x} \right)$

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58. Evaluate the following limit: $(\lim)_{x \rightarrow 2} \left(\frac{1}{x-2} - \frac{4}{x^3-2x^2} \right)$

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59. find $\lim_{x \rightarrow 1} \left(\frac{x^4 - 3x^2 + 2}{x^3 - 5x^2 + 3x + 1} \right)$

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60. Evaluate the following limit: $\lim_{x \rightarrow -2} \frac{x^3 + x^2 + 4x + 12}{x^3 - 3x + 2}$

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61. Evaluate the following limit: $(\lim)_{x \rightarrow 3} \frac{x^2 - 4x + 3}{x^2 - 2x - 3}$

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62. Evaluate the following limit: $(\lim)_{x \rightarrow 2} \frac{x^3 - 8}{x^2 - 4}$

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63. Evaluate the following limit: $(\lim)_{x \rightarrow 4} \frac{x^2 - 7x + 12}{x^2 - 3x - 4}$

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64. Evaluate the following limit: $(\lim)_{x \rightarrow 5} \frac{x^2 - 7x + 12}{x^2 - 3x - 4}$

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65. Evaluate the following limit: $(\lim)_{x \rightarrow 5} \frac{x^2 - 9x + 20}{x^2 - 6x + 5}$



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66. Evaluate the following limit: $(\lim)_{x \rightarrow 5} \frac{x^3 - 125}{x^2 - 7x + 10}$



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67. $\lim_{x \rightarrow \sqrt{3}} \frac{x^2 - 3}{x^2 + 3\sqrt{3}x - 12}$



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68. Evaluate the following limit: $(\lim)_{x \rightarrow 2} \left(\frac{x}{x-2} - \frac{4}{x^2 - 2x} \right)$



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69. Evaluate the following limit: $(\lim)_{x \rightarrow 3} \left(\frac{1}{x-3} - \frac{2}{x^2 - 4x + 3} \right)$



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70. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{(a+x)^2 - a^2}{x}$

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71. Evaluate the following limit: $(\lim)_{x \rightarrow 3} \left(\frac{1}{x-3} - \frac{3}{x^2-3x} \right)$

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72. Evaluate the following limit: $(\lim)_{x \rightarrow 3} (x^2 - 9) \left(\frac{1}{x+3} + \frac{1}{x-3} \right)$

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73. Evaluate the following limit: $(\lim)_{x \rightarrow 1} \frac{x^4 - 3x^3 + 2}{x^3 - 5x^2 + 3x + 1}$

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74. Evaluate the following limit: $(\lim)_{x \rightarrow -2} \frac{x^3 + x^2 + 4x + 12}{x^3 - 3x + 2}$

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75. Evaluate the following limit: $(\lim)_{x \rightarrow 2} \frac{x^3 + 3x^2 - 9x - 2}{x^3 - x - 6}$

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76. Evaluate the following limit: $(\lim)_{x \rightarrow 3} \frac{x^2 - x - 6}{x^3 - 3x^2 + x - 3}$

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77. Evaluate the following limit: $(\lim)_{x \rightarrow 1} \frac{x^3 + 3x^2 - 6x + 2}{x^3 + 3x^2 - 3x - 1}$

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78. Evaluate the following limit: $(\lim)_{x \rightarrow 1} \frac{x^7 - 2x^5 + 1}{x^3 - 3x^2 + 2}$



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79. Evaluate: $\lim_{x \rightarrow a} \frac{\sqrt{a+2x} - \sqrt{3x}}{\sqrt{3a+x} - 2\sqrt{x}}, (a \neq 0).$



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80. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\sqrt{1+x+x^2} - 1}{x}$



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81. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\sqrt{a^2+x^2} - a}{x^2}$



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82. Evaluate the following limit: $(\lim)_{x \rightarrow 2} \frac{\sqrt{3-x} - 1}{2-x}$



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83. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{x}{\sqrt{1+x} - \sqrt{1-x}}$

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84. Evaluate the following limit: $(\lim)_{x \rightarrow 1} \frac{x-1}{\sqrt{x^2+3}-2}$

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85. Evaluate the following limit: $(\lim)_{x \rightarrow 1} \frac{\sqrt{5x-4} - \sqrt{x}}{x^2-1}$

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86. Evaluate the following limit: $(\lim)_{x \rightarrow 2} \frac{\sqrt{x^2+1} - \sqrt{5}}{x-2}$

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87. Evaluate the following limit: $(\lim)_{x \rightarrow 7} \frac{4 - \sqrt{9 + x}}{1 - \sqrt{8 - x}}$

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88. Evaluate the following limit: $(\lim)_{x \rightarrow 2} \frac{\sqrt{1 + 4x} - \sqrt{5 + 2x}}{x - 2}$

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89. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{2x}{\sqrt{a + x} - \sqrt{a - x}}$

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90. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\sqrt{1 + x} - \sqrt{1 - x}}{2x}$

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91. Evaluate the following limit: $(\lim)_{x \rightarrow 3} \frac{x - 3}{\sqrt{x - 2} - \sqrt{4 - x}}$

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92. Evaluate the following limit: $(\lim)_{x \rightarrow 1} \frac{\sqrt{5x - 4} - \sqrt{x}}{x - 1}$

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93. Evaluate the following limit: $(\lim)_{x \rightarrow 3} \frac{\sqrt{x + 3} - \sqrt{6}}{x^2 - 9}$

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94. Find limit $\lim (x \rightarrow 0) \frac{\sqrt{1 + x} - 1}{x}$

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95. Evaluate the following limit: $(\lim)_{x \rightarrow 2} \frac{x - 2}{\sqrt{x} - \sqrt{2}}$

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96. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\sqrt{a+x} - \sqrt{a}}{x \sqrt{a^2 + ax}}$

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97. Evaluate the following limit: $(\lim)_{x \rightarrow 1} \frac{\sqrt{5x-4} - \sqrt{x}}{x^3 - 1}$

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98. Evaluate the following limit: $(\lim)_{x \rightarrow 1} \frac{\sqrt{3+x} - \sqrt{5-x}}{x^2 - 1}$

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99. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\sqrt{1+x^2} - \sqrt{1-x^2}}{x}$

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100. Evaluate the following limit: $(\lim)_{x \rightarrow 4} \frac{2 - \sqrt{x}}{4 - x}$

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101. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\sqrt{1+3x} - \sqrt{1-3x}}{x^2 - 1}$

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102. Evaluate the following limit: $(\lim)_{x \rightarrow 1} \frac{\sqrt{3+x} - \sqrt{5-x}}{x^2 - 1}$

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103. $\lim_{x \rightarrow \sqrt{10}} \frac{\sqrt{7 + 2x} - (\sqrt{5} + \sqrt{2})}{x^2 - 10}$ is equal to

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104. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\sqrt{1 + x + x^2} - \sqrt{x + 1}}{2x^2}$

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105. Evaluate the following limit: $(\lim)_{x \rightarrow a} \frac{x - a}{\sqrt{x} - \sqrt{a}}$

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106. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\sqrt{2 - x} - \sqrt{2 + x}}{x}$

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107. Evaluate the following limit: $(\lim)_{x \rightarrow 1} \frac{(2x - 3)(\sqrt{x} - 1)}{3x^2 + 3x - 6}$

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108. Evaluate: $(\lim)_{x \rightarrow 2} \frac{x - 2}{x^3 - 33}$

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109. If $(\lim)_{x \rightarrow -a} \frac{x^9 + a^9}{x + a} = 9$, find the real value of a .

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110. Evaluate the following limit: $(\lim)_{x \rightarrow a} \frac{(x + 2)^{5/2} - (a + 2)^{5/2}}{x - a}$

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111. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{(1+x)^6 - 1}{(1+x)^2 - 1}$

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112. Evaluate the following limit: $(\lim)_{x \rightarrow a} \frac{x^{5/7} - a^{5/7}}{x^{2/7} - a^{2/7}}$

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113. Evaluate (i) $(\lim)_{x \rightarrow 1} \frac{x^{15} - 1}{x^{10} - 1}$ (ii) $(\lim)_{x \rightarrow 0} \frac{\sqrt{1+x} - 1}{x}$

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114. Evaluate the following limit: $(\lim)_{x \rightarrow a} \frac{x^{2/3} - a^{2/3}}{x^{3/4} - a^{3/4}}$

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115. Evaluate the following limit: $(\lim)_{x \rightarrow a} \frac{(x + 2)^{3/2} - (a + 2)^{3/2}}{x - a}$

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116. Evaluate the following limit: $(\lim)_{x \rightarrow a} \frac{x^{2/7} - a^{2/7}}{x - a}$

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117. Evaluate the following limit: $(\lim)_{x \rightarrow -1/2} \frac{8x^3 + 1}{2x + 1}$

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118. Evaluate the following limit: $(\lim)_{x \rightarrow -1/2} \frac{8x^3 + 1}{2x + 1}$

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119. Evaluate the following limit: $(\lim)_{x \rightarrow 4} \frac{x^3 - 64}{x^2 - 16}$

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120. Evaluate the following limit: $(\lim)_{x \rightarrow -1} \frac{x^3 + 1}{x + 1}$

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121. If $\lim_{x \rightarrow a} \frac{x^5 - a^5}{x - a} = 5$, then find the sum of the possible real values of

a.

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122. If $\lim_{x \rightarrow a} \frac{x^5 - a^5}{x - a} = 5$, then find the sum of the possible real values

of a.

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123. If $(\lim)_{x \rightarrow a} \frac{x^9 - a^9}{x - a} = (\lim)_{x \rightarrow 5} (4 + x)$ find all possible values of a .

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124. If $(\lim)_{x \rightarrow a} \frac{x^3 - a^3}{x - a} = (\lim)_{x \rightarrow 1} \frac{x^4 - 1}{x - 1}$, find all possible value of a .

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125. Evaluate : $(\lim)_{x \rightarrow \infty} \frac{ax^2 + bx + c}{dx^2 + ex + f}$.

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126. Evaluate the following limit: $(\lim)_{x \rightarrow \infty} \frac{(3x - 1)(4x - 2)}{(x + 8)(x - 1)}$

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127. Evaluate the following limit: $(\lim)_{x \rightarrow \infty} (5x^3 - 6) / \sqrt{(9 + 4x^6)}$

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128. Evaluate the following limit: $(\lim)_{x \rightarrow \infty} \sqrt{x + 1} - \sqrt{x}$

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129. Evaluate $\lim_{x \rightarrow \infty} \frac{3x^3 - 4x^2 + 6x - 1}{2x^3 + x^2 - 5x + 7}$

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130. Evaluate the following limit: $(\lim)_{x \rightarrow \infty} \sqrt{x^2 + 7x} - x$

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131. Evaluate the following limit: $(\lim)_{n \rightarrow \infty} \frac{(n + 2)! + (n + 1)!}{(n + 2)! - (n + 1)!}$



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132. Evaluate the following limit: $(\lim)_{n \rightarrow \infty} (\sqrt{x+1} - \sqrt{x})\sqrt{x+2}$



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133. Evaluate the following limit:

$$(\lim)_{n \rightarrow \infty} \left(\frac{1}{n^2} + \frac{2}{n^2} + \frac{3}{n^2} + \dots + \frac{n-1}{n^2} \right)$$



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134. Evaluate the following limit: $(\lim)_{n \rightarrow \infty} \frac{1^3 + 2^3 + n^3}{(n-1)^4}$



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135. $\lim_{x \rightarrow \infty} \frac{x^4 + 7x^3 + 46x + a}{x^4 + 6}$ where a is a non-zero real number.



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136. Evaluate the following limit: $(\lim)_{x \rightarrow -\infty} (\sqrt{x^2 - 8x} + x)$

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137. Evaluate the following limit: $(\lim)_{x \rightarrow \infty} \frac{\sqrt{x^2 + a^2} - \sqrt{x^2 + b^2}}{\sqrt{x^2 + c^2} - \sqrt{x^2 + d^2}}$

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138. $\lim_{n \rightarrow \infty} \frac{1^2 + 2^2 + 3^2 + \dots + n^2}{n^3}$

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139. $\lim_{n \rightarrow \infty} \frac{1^2 + 2^2 + 3^2 + \dots + n^2}{n^3}$

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140. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{x^2}{\sin x^2}$

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141. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\sin x \cos x}{3x}$

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142. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{3 \sin x - 4 \sin^3 x}{x}$

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143. $\lim_{x \rightarrow 0} \frac{\tan mx}{\tan nx}$

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144. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\sin x^0}{x^0}$

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145. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\cos ax - \cos bx}{\cos cx - \cos dx}$

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146. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{1 - \cos mx}{x^2}$

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147. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\cos 3x - \cos 7x}{x^2}$

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148. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{x \cos x + 2 \sin x}{x^2 + \tan x}$

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149. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{5x \cos x + 3 \sin x}{3x^2 + \tan x}$

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150. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\sin 5x - \sin 3x}{\sin x}$

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151. Evaluate $\lim_{x \rightarrow 0} \frac{\tan 3x - 2x}{3x - \sin^2 x}$

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152. $\lim_{x \rightarrow 0} \frac{1 - \cos 2x + \tan^2 x}{x \sin x}$

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153. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{x^2 - \tan 2x}{\tan x}$



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154. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{x \tan x}{1 - \cos x}$



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155. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\sin 2x (\cos 3x - 3 \cos x)}{x^3}$



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156. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{x^3 \cot x}{1 - \cos x}$



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157. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\sin(3 + x) - \sin(3 - x)}{x}$



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158. $\lim_{x \rightarrow 0} \frac{\tan 8x}{\sin 2x}$

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159. $\lim_{x \rightarrow 0} \frac{\sin 5x}{\tan 3x}$

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160. $\lim_{x \rightarrow 0} \frac{7x \cos x - 3 \sin x}{4x + \tan x}$

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161. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\tan^2 3x}{x^2}$

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162. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{3 \sin 2x + 2x}{3x + 2 \tan 3x}$



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163. Evaluate the following limit: $(\lim)_{\theta \rightarrow 0} \frac{\sin 3\theta}{\tan 2\theta}$



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164. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\sin^2 4x^2}{x^4}$



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165. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{2x - s \in x}{\tan x + x}$



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166. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\sin 3x - \sin x}{\sin x}$



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167. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\cos 3x - \cos 5x}{x^2}$

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168. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\sin(2 + x) - \sin(2 - x)}{x}$

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169. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\tan x - \sin x}{\sin 3x - x \sin x}$

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170. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{1 - \cos 2x}{\cos 2x - \cos 8x}$

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171. Evaluate the following limit:

$$\lim_{x \rightarrow \infty} \frac{\sin(a+x) + \sin(a-x) - 2\sin a}{x \sin x}$$

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172. Evaluate the following limit: $\left(\lim_{x \rightarrow 0} \frac{x^2 + 1 - \cos x}{x \sin x} \right)$

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173. Evaluate the following limit: $\left(\lim_{x \rightarrow 0} \frac{2 \sin x - \sin 2x}{x^3} \right)$

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174. Evaluate the following limit: $\left(\lim_{x \rightarrow 0} \frac{x \tan x}{1 - \cos 2x} \right)$

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175. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\cos 2x - 1}{\cos x - 1}$

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176. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{3 \sin^2 x - 2 \sin x^2}{3x^2}$

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177. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{1 - \cos 4x}{x^2}$

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178. Evaluate the following limit: $\lim_{x \rightarrow 0} \frac{1 - \cos 2x}{3 \tan^2 x}$

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179. Evaluate the following limit: $(\lim)_{(x > 0)} (a + x \cos x) / (b \sin x)$



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180. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{2 \sin x - \sin 2x}{x^3}$



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181. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\cos ecx - \cot x}{x}$



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182. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{5x + 4 \sin 3x}{4 \sin 2x + 7x}$



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183. Evaluate the following limit: $(\lim)_{x \rightarrow 0} (\cos ecx - \cot x)$



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184. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{x \cos x - \sin x}{x^2 + \tan x}$

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185. Evaluate the following limit: $(\lim)_{\theta \rightarrow 0} \frac{1 - \cos 4\theta}{1 - \cos 6\theta}$

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186. Evaluate the following limit: $(\lim)_{\theta \rightarrow 0} \frac{\sin 3\theta}{\tan 3\theta}$

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187. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{1 - \cos 5x}{1 - \cos 6x}$

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188. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\sin 3x + 7x}{4x + \sin 2x}$



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189. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{3 \sin x - \sin 3x}{x^3}$



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190. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{s \in ax + bx}{ax + s \in bx}$



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191. Evaluate: $(\lim)_{h \rightarrow 0} \frac{(a + h)^2 \sin(a + h) - a^2 \sin a}{h}$



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192. If $(\lim)_{x \rightarrow 0} kx \cos ec x = (\lim)_{x \rightarrow 0} x \cos ec kx$ Find k



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193. Evaluate: $\left(\lim_{x \rightarrow \frac{\pi}{2}} \frac{\cot x}{\frac{\pi}{2} - x} \right)$

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194. Evaluate: $\left(\lim_{x \rightarrow \frac{\pi}{2}} \left(\frac{\pi}{2} - x \right) \tan x \right)$

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195. $\left(\lim_{x \rightarrow \frac{\pi}{2}} \frac{\tan 2x}{x - \frac{\pi}{2}} \right)$

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196. Evaluate the following limits: $\lim_{x \rightarrow \frac{\pi}{2}} \left(\frac{\pi}{2} - x \right) \tan x$

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197. Evaluate the following limit: $(\lim)_{x \rightarrow \frac{\pi}{2}} \frac{\cos^2 x}{1 - \sin x}$

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198. Evaluate the following limit: $(\lim)_{x \rightarrow a} \frac{\cos x - \cos a}{x - a}$

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199. Evaluate the following limit: $(\lim)_{x \rightarrow \frac{\pi}{2}} \frac{1 - \sin x}{\left(\frac{\pi}{2} - x\right)^2}$

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200. Evaluate the following limit: $(\lim)_{x \rightarrow \frac{\pi}{8}} \frac{\cot 4x - \cos 4x}{(\pi - 8x)^3}$

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201. Evaluate the following limit: $(\lim)_{x \rightarrow \pi} \frac{\sqrt{5 + \cos x} - 2}{(\pi - x)^2}$

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202. Evaluate the following limit: $(\lim)_{x \rightarrow a} \frac{\sin \sqrt{x} - \sin \sqrt{a}}{x - a}$

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203. Evaluate the following limit: $(\lim)_{x \rightarrow \frac{\pi}{4}} \frac{f(x) - f\left(\frac{\pi}{4}\right)}{x - \frac{\pi}{4}}$, where $f(x) = \sin 2x$

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204. Evaluate the following limit: $(\lim)_{x \rightarrow 1} \frac{1 - x^2}{s \in \pi x}$

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205. Evaluate the following limit: $(\lim)_{x \rightarrow \pi} \frac{1 + \cos x}{\tan^2 x}$

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206. Evaluate the following limit: $(\lim)_{n \rightarrow \infty} 2^{n-1} \sin\left(\frac{a}{2^n}\right)$

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207. Evaluate the following limit: $(\lim)_{x \rightarrow \frac{\pi}{2}} \frac{\sin 2x}{\cos x}$

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208. Evaluate $\lim_{x \rightarrow \pi} \frac{\sqrt{1 - \cos 6x}}{\sqrt{2}\left(\frac{\pi}{3} - x\right)}$

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209. Evaluate the following limit: $(\lim)_{x \rightarrow \frac{\pi}{4}} \frac{1 - \tan x}{x - \frac{\pi}{4}}$

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210. Evaluate the following limit: $(\lim)_{x \rightarrow \frac{\pi}{3}} \frac{\sqrt{3} - \tan x}{\pi - 3x}$

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211. Evaluate the following limit: $(\lim)_{x \rightarrow \pi/2} \frac{\sqrt{2} - \sqrt{1 + \sin x}}{\cos^2 x}$

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212. Evaluate the following limit: $(\lim)_{x \rightarrow \frac{\pi}{4}} \frac{\sqrt{2} - \cos x - \sin x}{\left(\frac{\pi}{4} - x\right)^2}$

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213. Evaluate the following limit: $(\lim)_{x \rightarrow a} \frac{\cos x - \cos a}{\sqrt{x} - \sqrt{a}}$

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214. Evaluate the following limit: $(\lim)_{x \rightarrow a} \frac{\cos \sqrt{x} - \cos \sqrt{a}}{x - a}$

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215. Evaluate the following limit: $(\lim)_{x \rightarrow 1} \frac{1 + \cos \pi x}{(1 - x)^2}$

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216. Evaluate $(\lim)_{x \rightarrow \frac{\pi}{4}} \frac{1 - \sin 2x}{1 + \cos 4x}$

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217. Evaluate: $\lim_{n \rightarrow \infty} n \cos\left(\frac{\pi}{4n}\right) \sin\left(\frac{\pi}{4n}\right)$



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218. Evaluate the following limit: $(\lim)_{n \rightarrow \infty} \frac{\sin\left(\frac{a}{2^n}\right)}{\sin\left(\frac{b}{2^n}\right)}$



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219. Evaluate the following limit: $(\lim)_{x \rightarrow 2} \frac{x^2 - x - 2}{x^2 - 2x + \sin(x - 2)}$



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220. $(\lim)_{x \rightarrow 1} (1 - x) \tan\left(\pi \frac{x}{2}\right) = _ _ _$



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221. The value of $\lim (x \rightarrow \pi) \frac{\sqrt{2 + \cos x} - 1}{(x - \pi)^2}$



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222. Evaluate the following limit: $(\lim)_{x \rightarrow 1} \frac{1 - \frac{1}{x}}{\sin \pi(x - 1)}$

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223. Evaluate the following limit: $(\lim)_{x \rightarrow \frac{\pi}{4}} \frac{\sqrt{2} - \cos x - \sin x}{(4x - \pi)^2}$

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224. Evaluate the following limit: $(\lim)_{x \rightarrow \frac{\pi}{4}} \frac{\cos x - \sin x}{\left(\frac{\pi}{4} - x\right)(\cos x + \sin x)}$

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225. Evaluate the following limit: $(\lim)_{x \rightarrow \frac{\pi}{4}} \frac{1 - \tan x}{1 - \sqrt{2} \sin x}$

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226. Evaluate the following limit: $(\lim)_{x \rightarrow \frac{\pi}{2}} \frac{\left(\frac{\pi}{2} - x\right) \sin x - 2 \cos x}{\left(\frac{\pi}{2} - x\right) + \cot x}$

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227. Evaluate the following limit: $(\lim)_{x \rightarrow \pi} \frac{1 + \cos x}{\tan^2 x}$

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228. Evaluate the following limit: $(\lim)_{x \rightarrow \frac{\pi}{6}} \frac{\cot^2 x - 3}{\cos ecx - 2}$

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229. Evaluate the following limit: $(\lim)_{x \rightarrow \frac{\pi}{4}} \frac{2 - \cos ecx^2 x}{1 - \cot x}$

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230. The value of $\lim (x \rightarrow \pi) \frac{\sqrt{2 + \cos x} - 1}{(\pi - x)^2}$

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231. Evaluate the following limit: $(\lim)_{x \rightarrow \frac{3\pi}{2}} \frac{1 + \cos ec^3 x}{\cot^2 x}$

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232. Evaluate: $(\lim)_{x \rightarrow e} \frac{\log x - 1}{x - e}$

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233. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{5^x - 1}{\sqrt{4 + x} - 2}$

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234. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{a^x + b^x - 2}{x}$

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235. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{8^x - 4^x - 2^x + 1}{x^2}$

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236. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{5^x + 3^x + 2^x - 3}{x}$

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237. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{e^x - 1 + \sin x}{x}$

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238. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{e^{\sin x} - 1}{x}$



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239. Evaluate: $(\lim)_{x \rightarrow a} \frac{\log x - \log a}{x - a}$



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240. Evaluate: $(\lim)_{x \rightarrow a} \frac{\log x - \log a}{x - a}$



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241. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\log(2 + x) + \log 0.5}{x}$



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242. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\log(3 + x) - \log(3 - x)}{x}$



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243. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{x(2^x - 1)}{1 - \cos x}$

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244. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\log(1 + x)}{3^x - 1}$

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245. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{a^{mx} - 1}{b^{nx} - 1}, n \neq 0$

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246. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{9^x - 26^x + 4^x}{x^2}$

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247. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{a^{mx} - b^{nx}}{x}$



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248. Evaluate the following limit: $(\lim)_{x \rightarrow \infty} (a^{1/x} - 1)x$



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249. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{a^x + b^x - c^x - d^x}{x}$



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250. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\sin 2x}{e^x - 1}$



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251. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{\log(a+x) - \log(a-x)}{x}$



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252. Evaluate the following limit: $(\lim)_{x \rightarrow 5} \frac{e^x - e^5}{x - 5}$

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253. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{e^{x+2} - e^2}{x}$

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254. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{e^{3x} - e^{2x}}{x}$

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255. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{e^{bx} - e^{ax}}{x}$ where $a \neq b$

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256. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{a^x - a^{-x}}{x}$



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257. Evaluate the following limit: $\lim_{x \rightarrow \frac{\pi}{2}} \frac{e^{\cos x} - 1}{\cos x}$



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258. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{e^x - x - 1}{x^2}$



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259. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{e^{\tan x} - 1}{\tan x}$



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260. Evaluate the following limit: $(\lim)_{x \rightarrow 0} \frac{e^{\tan x} - 1}{x}$



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261. Evaluate the following limit: $(\lim)_{x \rightarrow 0} (\cos x)^{\frac{1}{\sin x}}$

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262. Evaluate the following limit: $(\lim)_{x \rightarrow 0^+} (1 + \tan^2 \sqrt{x})^{1/2x}$

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263. Evaluate the following limit: $(\lim)_{x \rightarrow 0} (\cos x + a \sin bx)^{\frac{1}{x}}$

A. e^a B. e^ab C. e^b D. $e^{\frac{a}{b}}$

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264. Evaluate the following limit: $(\lim)_{x \rightarrow \infty} \left(\frac{x^2 + 2x + 3}{2x^2 + x + 5} \right)^{\frac{3x-2}{3x+2}}$

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265. Write the value of $(\lim)_{x \rightarrow 0} \frac{\sqrt{1 - \cos 2x}}{x}$

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266. Write the value of $(\lim)_{x \rightarrow 0^+} [x]$

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267. Write the value of $(\lim)_{x \rightarrow 0^-} \frac{\sin[x]}{[x]}$

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268. Write the value of $(\lim)_{x \rightarrow \infty} \frac{\sin x}{x}$

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269. Write the value of $(\lim)_{x \rightarrow 0} \frac{\sin x^0}{x}$



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270. Write the value of $(\lim)_{x \rightarrow 0} \frac{\sin x}{\sqrt{1+x} - 1}$



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271. Write the value of $(\lim)_{n \rightarrow \infty} \frac{n! + (n+1)!}{(n+1)! + (n+2)!}$



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272. Write the value of $(\lim)_{n \rightarrow \infty} \frac{1 + 2 + 3 + \dots + n}{n^2}$



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273. Write the value of $(\lim)_{x \rightarrow 0^-} [x]$



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274. Write the value of $(\lim)_{x \rightarrow 1^-} x - [x]$

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275. Write the value of $(\lim)_{x \rightarrow \pi} \frac{\sin x}{x - \pi}$

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276. Write the value of $(\lim)_{x \rightarrow 2} \frac{|x - 2|}{x - 2}$

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277. Write the value of $(\lim)_{x \rightarrow 0^+} \frac{\sin x}{\sqrt{x}}$

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278. Write the value of $(\lim)_{x \rightarrow -\infty} (3x + \sqrt{9x^2 - x})$



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279. Write the value of $(\lim)_{x \rightarrow \pi/2} \frac{2x - \pi}{\cos x}$



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280. $(\lim)_{n \rightarrow \infty} \frac{1^2 + 2^2 + 3^2 + \dots + n^2}{n^3}$ is equal to a. 1 b. $1/3$ c. $1/3$ d. 0



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281. $(\lim)_{x \rightarrow 0} \frac{\sin 2x}{x}$ is equal to a. 1 b. $1/2$ c. 2 d. 0



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282. If $f(x) = x \sin\left(\frac{1}{x}\right)$, $x \neq 0$ then $(\lim)_{x \rightarrow 0} f(x) =$

A. a. 1

B. b . -1

C. c. 0

D. d. does not exist

Answer: null

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283. $(\lim)_{x \rightarrow 0} \frac{1 - \cos 2x}{x}$ is a. 1 b . 2 c. 4 d. 0

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284. $(\lim)_{x \rightarrow 0} \frac{x}{\tan x}$ is a. 1 b . 0 c. 4 d. not defined

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285. $(\lim)_{x \rightarrow \infty} \frac{\sin x}{x}$ equals a. 1 b . 0 c. ∞ d. does not exist

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286. $\lim_{x \rightarrow 0} (\sin x) / x$ is equal to a. 1 b. π c. x d. $\pi/180$

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287. $(\lim)_{x \rightarrow a} \frac{x^n - a^n}{x - a}$ is equal to a. na^n b. na^{n-1} c. na d. 1

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288. $(\lim)_{x \rightarrow \infty} \frac{\sqrt{x^2 - 1}}{2x + 1}$ is equal to a. 0 b. -1 c. $1/2$ d. 1

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289. Evaluate the limit: $(\lim)_{h \rightarrow 0} \left[\frac{1}{(8 + h)^{\frac{1}{3}}} - \frac{1}{2h} \right]$

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290. $(\lim)_{x \rightarrow 1} \frac{\sin \pi x}{x - 1}$ is equal to a. $-\pi$ b. π c. $-\frac{1}{\pi}$ d. $\frac{1}{\pi}$

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291. $(\lim)_{x \rightarrow 0} \frac{\sqrt{1+x} - 1}{x}$ is equal to a. 1 b. 0 c. 2 d. $\frac{1}{2}$

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292. If $f(x) = \begin{cases} x \sin\left(\frac{1}{x}\right), & x \neq 0, \\ \end{cases}$ then $(\lim)_{(x \rightarrow 0)} f(x)$ equals a. 1 b. 0 c.

-1 d. none of these

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293. $(\lim)_{n \rightarrow \infty} \frac{n!}{(n+1)! + n!}$ is equal to a. 1 b. 0 c. 2 d. $\frac{1}{2}$

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294. $\lim_{x \rightarrow \frac{\pi}{4}} \frac{4\sqrt{2} - (\cos x + \sin x)^5}{1 - \sin 2x}$ is equal to

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295. $(\lim_{x \rightarrow \infty} a^x \sin\left(\frac{b}{a^x}\right))$, $a, b > 1$ is equal to a. $b \cdot a$ b. $a \cdot b$ c. $a(\log)_e b$ d. $b(\log)_e a$

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296. $(\lim_{\theta \rightarrow \pi/2} \frac{1 - \sin \theta}{(\pi/2 - \theta) \cos \theta})$ is equal to
a. 1 b. -1 c. $-\frac{1}{2}$ d. $\frac{1}{2}$

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297. The value of $(\lim_{x \rightarrow \pi/2} (\sec x - \tan x))$ is a. 1 b. 0 c. 2 d. -1

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298. The value of $(\lim)_{x \rightarrow \infty} \frac{n!}{(n+1)! - (n)!}$ is a. 1 b. -1 c. 0 d. none of these

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299. The value of $(\lim)_{n \rightarrow \infty} \frac{(n+2)! + (n+1)!}{(n+2)! - (n+1)!}$ is a. 1 b. -1 c. 0 d. none of these

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300. The value of $(\lim)_{n \rightarrow \infty} \left\{ \frac{1+2+3+\dots+n}{n+2} - \frac{n}{2} \right\}$ is a. 1 b. -1 c. 1/2 d. -1/2

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301. $(\lim)_{x \rightarrow \infty} |x|/x$ is equal to

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302. $\left(\lim_{x \rightarrow 0} \frac{|\sin x|}{x} \right)$ is a. 1 b. -1 c. 0 d. none of these



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