

Sample Test

Show all your work. Indicate clearly the methods you use because you will be graded on the correctness of your methods, as well as on the accuracy of your final answers.

Evaluate the following limits.

1. $\lim_{x \rightarrow -\infty} -12x =$

2. $\lim_{x \rightarrow 0} \frac{6x - 9}{x^3 - 12x + 3} =$

3. $\lim_{t \rightarrow -\infty} \frac{5 - 2t^3}{t^2 + 1} =$

4. $\lim_{t \rightarrow -\infty} \frac{1 + t^2}{-2t^3 + 5} =$

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

6. $\lim_{x \rightarrow 2} \frac{-4x + x^2 + 4}{x^2 + x - 6} =$

7. $\lim_{x \rightarrow -4^+} \frac{-3}{x + 4} =$

8. $\lim_{x \rightarrow \frac{5}{3}^-} \frac{2x}{5 - 3x} =$

9. $\lim_{x \rightarrow 0} \frac{\sqrt{x+3} - \sqrt{3}}{x} =$

10. a) Explain why the following calculation is incorrect.

$$\lim_{x \rightarrow 0^+} \left(\frac{1}{x} - \frac{1}{x^2} \right) = \lim_{x \rightarrow 0^+} \frac{1}{x} - \lim_{x \rightarrow 0^+} \frac{1}{x^2} = +\infty - (+\infty) = 0$$

b) Show that $\lim_{x \rightarrow 0^+} \left(\frac{1}{x} - \frac{1}{x^2} \right) = -\infty$

11. Let $P(x) = \begin{cases} x - 1, & \text{if } x < 3 \\ -2, & \text{if } x = 3 \\ 3x - 7, & \text{if } x > 3 \end{cases}$

Find each of the following limits.

a) $\lim_{x \rightarrow 3^-} P(x) =$ b) $\lim_{x \rightarrow 3^+} P(x) =$ c) $\lim_{x \rightarrow 3} P(x) =$

12. Rewrite $\frac{|4 - 5x| - 3x + |3x|}{|2x|}$ in simplest form, without using absolute value bars or radical symbols.

13. Determine the domain of the following function:

$$F(x) = \sqrt{\frac{3x(2x+5)(3-4x)}{(x^2+25)(x-4)}}$$

14. Solve $|4 - 3z| > 5$ 15. Solve $|2 + 7x| \leq 4$

16. Solve $|4 - 3u| = -2$

17. Graph $Q(x) = \begin{cases} 3 - x, & \text{if } x < 3 \\ -4, & \text{if } x = 3 \\ \frac{1}{9}x^2, & \text{if } x > 3 \end{cases}$

In problems 18-21 write the equation of a line satisfying the given conditions:

18. Passing through the points (2,4), and (-5,3).