

A. Find each of the following limits if they exist. If they do not exist, give reasons for your answers.

1. $\lim_{x \rightarrow -2} (3x^2 - 2x + 7)$

2. $\lim_{x \rightarrow 2} \left(4x^2 - \frac{2}{x} \right)$

3. $\lim_{x \rightarrow 2} \left(\frac{x^2 + x - 6}{x^2 + 3x - 10} \right)$

4. $\lim_{x \rightarrow 3} \left(\frac{4x^2 - 7x - 11}{x^2 - 3x - 18} \right)$

5. $\lim_{x \rightarrow 1} \left(\frac{\sqrt{3x + 4} - \sqrt{5x + 2}}{\sqrt{2x^2 + 7x} - 3} \right)$

6. $\lim_{x \rightarrow 3} \left(\frac{2x^2 + x - 15}{x^2 + 3x - 18} \right)$

7. $\lim_{x \rightarrow 2} \left(\frac{4x - 8}{\sqrt{2x + 5} - \sqrt{x^2 + 5}} \right)$

8. $\lim_{x \rightarrow 3} \left(\frac{|x - 3|}{x - 3} \right)$

9. $\lim_{x \rightarrow 3} \left(\frac{2x^2 - 11x + 15}{x^2 + 3x - 18} \right)$

10. $\lim_{x \rightarrow 0} \left(\frac{1}{x\sqrt{1+x}} - \frac{1}{x} \right)$

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Worksheet 3 (Limits)

11. $\lim_{x \rightarrow \frac{3}{2}} \left(\frac{2x - 3}{|2x - 3|} \right)$
12. $\lim_{x \rightarrow 2} \left(\frac{2}{x - 2} \right)$
13. $\lim_{x \rightarrow 3} \left(\frac{1}{(x - 3)^2} \right)$
14. $\lim_{x \rightarrow 0^-} \left(\frac{1}{x} - \frac{1}{|x|} \right)$
15. $\lim_{x \rightarrow 0^+} \left(\frac{1}{x} - \frac{1}{|x|} \right)$
16. $\lim_{x \rightarrow 1} \left(\frac{x^2 - 1}{|x - 1|} \right)$
17. $\lim_{x \rightarrow 4} \left(\frac{\sqrt{2x + 1} - 3}{x^2 - 16} \right)$
18. $\lim_{x \rightarrow 2} \left(\frac{\sqrt{6 - x} - 2}{\sqrt{3 - x} - 1} \right)$
19. $\lim_{x \rightarrow 4} \left(\frac{\sqrt{2x + 1} - x + 1}{x^2 - 16} \right)$
20. $\lim_{x \rightarrow 2} \left(\frac{2x - \sqrt{5x + 6}}{x^2 - 4x + 4} \right)$

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Worksheet 3 (Limits)

B.

1. Find a so that $\lim_{x \rightarrow -2} f(x)$ exists when $f(x) = \frac{3x^2 + ax + a + 3}{x^2 + x - 2}$

2. Given that f is defined as given below, find value(s) of k and a so that $\lim_{x \rightarrow -1} f(x)$ exists.

$$f(x) = \begin{cases} \frac{1}{2} + a & x \leq -1 \\ \frac{4kx^2 + (k + 4)x + 1}{x^2 - 1} & x > -1 \end{cases}$$