

More Practice with Limits

1. Let $f(x) = \begin{cases} 6x^2 + 5 & x < 0 \\ \frac{3 - 4x^3}{1 - 7x + x^3} & x \geq 0 \end{cases}$.

a) $\lim_{x \rightarrow 0} f(x)$

b) $\lim_{x \rightarrow \infty} f(x)$

c) $\lim_{x \rightarrow -\infty} f(x)$

2. Let $g(y) = \begin{cases} y^2 + 5 & y < -2 \\ 1 - 3y & y \geq -2 \end{cases}$

a) $\lim_{y \rightarrow 6} g(y)$

b) $\lim_{y \rightarrow -2} g(y)$

c) $\lim_{y \rightarrow \infty} g(y)$

3. $\lim_{x \rightarrow 16} \frac{\sqrt{x} - 4}{x - 16}$

4. $\lim_{x \rightarrow 4} \frac{8 - 2x}{\sqrt{2x + 1} - \sqrt{13 - x}}$

5. $\lim_{x \rightarrow 1} \frac{\frac{1}{x} - 1}{x^2 - 1}$

6. $\lim_{x \rightarrow 4} \frac{\frac{2}{x-3} - \frac{8}{x}}{x-4}$

7. $\lim_{x \rightarrow 0} \frac{(x+1)^3 - 1}{x}$

8. $\lim_{x \rightarrow 0} \frac{(x-2)^3 + 8}{x}$

9. a) $\lim_{x \rightarrow \infty} \frac{\sqrt{5x^2 + 19x - 200}}{10 - 9x}$

10. $\lim_{x \rightarrow -\infty} \frac{2 + 5x}{\sqrt{2 + 5x^2}}$

b) $\lim_{x \rightarrow -\infty} \frac{\sqrt{5x^2 + 19x - 200}}{10 - 9x}$

11. $\lim_{x \rightarrow 1} \frac{\frac{1}{x+4} - \frac{1}{2x+3}}{x-1}$

12. $\lim_{x \rightarrow 1} \frac{x^4 - 1}{x - 1}$

13. Find k such that $\lim_{x \rightarrow 3} f(x)$ exists if $f(x) = \begin{cases} 2x^2 - 5x - 3 & x \leq 3 \\ kx^2 - 2x - 1 & x > 3 \end{cases}$.