

Limits solved Analytically Review (direct substitution, factoring, fractions)

Do the following problems on your own paper. Please write the problem, then solve. Showing all work.

**In Exercises 5–22, find the limit.**

5.  $\lim_{x \rightarrow 2} x^3$

7.  $\lim_{x \rightarrow 0} (2x - 1)$

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

11.  $\lim_{x \rightarrow -3} (2x^2 + 4x + 1)$

13.  $\lim_{x \rightarrow 3} \sqrt{x + 1}$

15.  $\lim_{x \rightarrow -4} (x + 3)^2$

17.  $\lim_{x \rightarrow 2} \frac{1}{x}$

19.  $\lim_{x \rightarrow 1} \frac{x}{x^2 + 4}$

21.  $\lim_{x \rightarrow 7} \frac{3x}{\sqrt{x + 2}}$

**In Exercises 23–26, find the limits.**

23.  $f(x) = 5 - x$ ,  $g(x) = x^3$

(a)  $\lim_{x \rightarrow 1} f(x)$

(b)  $\lim_{x \rightarrow 4} g(x)$

(c)  $\lim_{x \rightarrow 1} g(f(x))$

24.  $f(x) = x + 7$ ,  $g(x) = x^2$

(a)  $\lim_{x \rightarrow -3} f(x)$

(b)  $\lim_{x \rightarrow 4} g(x)$

(c)  $\lim_{x \rightarrow -3} g(f(x))$

**In Exercises 27–36, find the limit of the trigonometric function.**

27.  $\lim_{x \rightarrow \pi/2} \sin x$

29.  $\lim_{x \rightarrow 1} \cos \frac{\pi x}{3}$

31.  $\lim_{x \rightarrow 0} \sec 2x$

33.  $\lim_{x \rightarrow 5\pi/6} \sin x$

35.  $\lim_{x \rightarrow 3} \tan\left(\frac{\pi x}{4}\right)$

In Exercises 49–64, find the limit (if it exists).

$$49. \lim_{x \rightarrow 0} \frac{x}{x^2 - x}$$

$$51. \lim_{x \rightarrow 4} \frac{x - 4}{x^2 - 16}$$

$$53. \lim_{x \rightarrow -3} \frac{x^2 + x - 6}{x^2 - 9}$$

$$55. \lim_{x \rightarrow 4} \frac{\sqrt{x + 5} - 3}{x - 4}$$

$$57. \lim_{x \rightarrow 0} \frac{\sqrt{x + 5} - \sqrt{5}}{x}$$

$$59. \lim_{x \rightarrow 0} \frac{[1/(3 + x)] - (1/3)}{x}$$

$$61. \lim_{\Delta x \rightarrow 0} \frac{2(x + \Delta x) - 2x}{\Delta x}$$