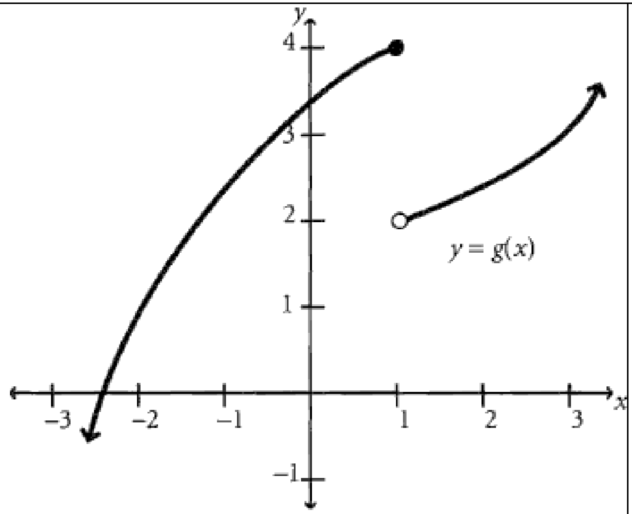
Mustang Race: Limits

Find the indicated limit. Which method is most appropriate: Numerical, Analytic, or Graphical?

1. $\lim_{x \to -3} (3x+2)$	**2.** $\lim_{x \to -1} \frac{x^3-1}{x-1}$
3. $\lim_{x \to -1} \frac{2x^2-x-3}{x+1}$	**4.** $\lim_{x \to 0^-} \frac{x+1}{x}$
5. $\lim_{x \to 3} \frac{x^2-5x+6}{x-3}$	**6.** $\lim_{x \to 3} \frac{\sqrt{x+1}-2}{x-3}$
7. $\lim_{x \to 4} \frac{x-4}{\sqrt{x}-2}$	**8.** $\lim_{x \to \infty} \frac{4x^3-6x^2+3}{5x^3+7x^2-9}$
9. $\lim_{x \to \infty} \frac{9x^4+7x^2+8x}{4x^5+3x-12}$	**10.** $\lim_{x \to -\infty} \frac{3x^5-7x^2+5x+1}{7x^3+2x+5}$
11. $\lim_{x \to 0} \frac{\sin 4x}{3x}$	**12.** $\lim_{\theta \to 0} \frac{\sin \theta}{\theta^2+2\theta}$
13. $\lim_{s \to 1} f(s)$ where $f(s) = \begin{cases} s & s<1 \\ 1-s & s>1 \end{cases}$	**14.** $\lim_{s \to 2} f(s)$ where $f(s) = \begin{cases} 3s & s<2 \\ 8-s & s>2 \end{cases}$
15. $\lim_{x \to 3} \frac{\frac{1}{x}-\frac{1}{3}}{x-3}$	



16.

a) $g(3)$

b) $g(1)$

c) $g(-2)$

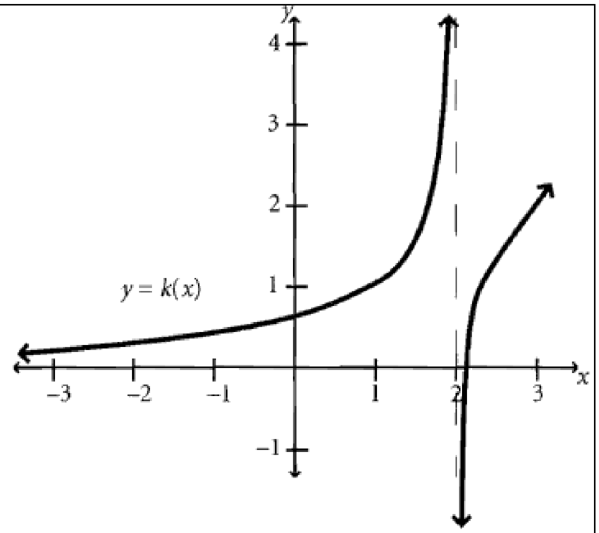
d) $\lim_{x \to -2} g(x)$

e) $\lim_{x \to 1^-} g(x)$

f) $\lim_{x \to 1^+} g(x)$

g) $\lim_{x \to 1} g(x)$

h) $\lim_{x \to -\infty} g(x)$



17.

a) $k(1)$

b) $k(3)$

c) $k(2)$

d) $\lim_{x \to 2^-} k(x)$

e) $\lim_{x \to 2^+} k(x)$

f) $\lim_{x \to 2} k(x)$

g) $\lim_{x \to \infty} k(x)$

h) $\lim_{x \to -\infty} k(x)$

ANSWERS

1. –7

2. 1

3. –5

4. –∞

5. 1

6. ¼

7. 4

8. $\frac{4}{5}$

9. 0

10. ∞

11. $\frac{4}{3}$

12. ½

13. DNE b/c $\lim_{x\to 1^-} f(s) \neq \lim_{x\to 1^+} f(s)$

14. 6

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

16. **a)** 3

b) 4

c) 1

d) 1

e) 4

f) 2

g) DNE b/c $\lim_{x\to 1^-} g(x) \neq \lim_{x\to 1^+} g(x)$

h) $-\infty$

17. **a)** 1

b) 2

c) ∞

d) ∞

e) $-\infty$

f) DNE b/c $\lim_{x\to 2^-} g(x) \neq \lim_{x\to 2^+} g(x)$

g) ∞

h) 0