

AP Calculus AB
Infinite Limits & Asymptotes
Homework

Evaluate each limit.

1)
$$\lim_{x \rightarrow +\infty} \frac{2,000}{x+1}$$

6)
$$\lim_{x \rightarrow +\infty} \frac{(3x^2 - 10)(x^2 + x)}{(4x^3 - x^2 + 1)(x - 7)}$$

2)
$$\lim_{x \rightarrow +\infty} \frac{3x+5}{x-2}$$

7)
$$\lim_{x \rightarrow -\infty} \frac{(2x+1)(x+5)(x-3)}{x^4 + 9}$$

3)
$$\lim_{x \rightarrow +\infty} \frac{x+2}{3x-5}$$

8)
$$\lim_{t \rightarrow +\infty} \left(\frac{8t+1}{7t} - \frac{1-t}{t+5} \right)$$

4)
$$\lim_{s \rightarrow -\infty} \frac{3s+4}{7-2s}$$

9)
$$\lim_{x \rightarrow +\infty} \left(\frac{x}{x+1} - \frac{2x}{x-1} \right)$$

5)
$$\lim_{x \rightarrow -\infty} \frac{(2x+5)(x-3)}{(7x-2)(4x+1)}$$

10)
$$\lim_{t \rightarrow +\infty} \left(\frac{8t+5}{3-2t} \right)^3$$

$$11) \lim_{t \rightarrow +\infty} \frac{\sqrt{18t^2 + t - 4}}{3t + 2t^2}$$

$$14) \lim_{x \rightarrow \infty} \left(-\frac{\ln x}{x^4} + 1 \right)$$

$$12) \lim_{x \rightarrow +\infty} \frac{x}{\sqrt{x^2 + 1,000}}$$

$$15) \lim_{x \rightarrow \infty} -\frac{2x}{\cos\left(\frac{1}{x}\right)}$$

$$13) \lim_{x \rightarrow -\infty} \frac{3x}{\sqrt{4x^2 + 10}}$$

Find the vertical asymptotes of $f(x)$. Describe the behavior of $f(x)$ to the left and right of each asymptote.

$$16) f(x) = \frac{x^2 - 1}{2x + 4}$$

$$17) f(x) = \frac{1-x}{2x^2 - 5x - 3}$$

$$18) f(x) = \frac{x-2}{3x^2 - 5x - 2}$$