

AP Calculus: 1.5&3.5 Review

Evaluate.

| | | |
|---|--|--|
| 1) $\lim_{x \rightarrow -3^-} \frac{2x}{x+3}$ | 7) $\lim_{x \rightarrow \infty} \frac{x^3}{4x^2 + 3}$ | 13) $\lim_{x \rightarrow \infty} \frac{x+1}{2x^2 + 2x + 1}$ |
| 2) $\lim_{x \rightarrow -\infty} \frac{\sqrt{2x^2 + 3}}{2x + 3}$ | 8) $\lim_{x \rightarrow \infty} \frac{\sin x}{x}$ | 14) $\lim_{x \rightarrow -3^-} -\frac{2}{x+3}$ |
| 3) $\lim_{x \rightarrow \frac{3\pi^+}{4}} -2 \tan(2x)$ | 9) $\lim_{x \rightarrow -\infty} \frac{x+2}{x^2 + x + 1}$ | 15) $\lim_{x \rightarrow -\infty} \frac{\sqrt{2x^2 + 1}}{4x + 2}$ |
| 4) $\lim_{x \rightarrow 1} -\frac{3}{x-1}$ | 10) $\lim_{x \rightarrow \frac{\pi^-}{4}} 2 \sec(2x)$ | 16) $\lim_{x \rightarrow \infty} \cos(2x)$ |
| 5) $\lim_{x \rightarrow \infty} x \cos \frac{1}{x}$ | 11) $\lim_{x \rightarrow 3^-} -\frac{4x}{x-3}$ | 17) $\lim_{x \rightarrow -2^-} \frac{x+2}{x^2 + x - 2}$ |
| 6) $\lim_{x \rightarrow -2^+} \frac{1}{x^2 - 4}$ | 12) $\lim_{x \rightarrow -\infty} \frac{2x^2}{x^2 - 4}$ | 18) $\lim_{x \rightarrow \infty} \left(8 + \frac{1}{x} \right)$ |

State the vertical and horizontal asymptotes (if any).

| | | |
|---|--|---|
| 19) $f(x) = \frac{x^2 + 2x}{-4x + 8}$ | 21) $f(x) = \frac{\sqrt{9x^2 - 2}}{2x + 1}$ | 23) $f(x) = \frac{3x^2 - 12x}{x^2 - 2x - 3}$ |
| 20) $f(x) = \frac{3x}{\sqrt{x^2 + 2}}$ | 22) $f(x) = \frac{x^3 - x^2 - 6x}{-3x^2 - 3x + 18}$ | 24) $f(x) = \frac{1}{3x^2 + 3x - 18}$ |

Answers

| | | | | | |
|----|-----------------------------|----|-------------------------------------|----|--------------------------------|
| 1 | ∞ | 7 | ∞ | 13 | 0 |
| 2 | $-\sqrt{2}/2$ | 8 | 0 | 14 | ∞ |
| 3 | ∞ | 9 | 0 | 15 | $-\sqrt{2}/4$ |
| 4 | dne | 10 | ∞ | 16 | dne |
| 5 | ∞ | 11 | ∞ | 17 | $-1/3$ |
| 6 | $-\infty$ | 12 | 2 | 18 | 8 |
| 19 | VA: $x = 2$ HA: none | 21 | VA: $x = -1/2$ HA: $y = \pm 3/2$ | 23 | VA: $x = -1, 3$ HA: $y = 3$ |
| 20 | VA: none HA: $y = \pm 3$ | 22 | VA: $x = -3, 2$ HA: none | 24 | VA: $x = -3, 2$ HA: $y = 0$ |