

AP Calculus BC
Unit 1 Review

Name: _____

Find the limit for each. Show ALL work and reasoning.

1) $\lim_{x \rightarrow 3} \sqrt{x+1}$

2) $\lim_{x \rightarrow -4} \frac{x+4}{x^2+9x+20}$

3) $\lim_{x \rightarrow -3} \frac{x^3+27}{x+3}$

4) $\lim_{x \rightarrow 0} \frac{\sin(3x)}{x}$

5) $\lim_{x \rightarrow 0} \frac{5 \tan(x)}{\tan(3x)}$

6) $\lim_{x \rightarrow 3} \frac{\sqrt{x+1}-2}{x-3}$

7) $\lim_{x \rightarrow 1} \frac{e^x}{2x^2-x}$

8) $\lim_{x \rightarrow 0} \frac{3(1-\cos(x))}{x}$

9) $\lim_{x \rightarrow 0} \frac{4(e^{2x}-1)}{e^x-1}$

10) Find the value for each using the graph at the right.

a. $f(-2)$

b. $\lim_{x \rightarrow 1} f(x)$

c. $f(0)$

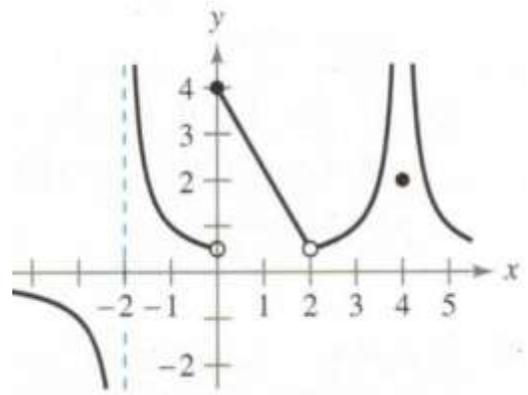
d. $\lim_{x \rightarrow 0} f(x)$

e. $f(2)$

f. $\lim_{x \rightarrow 2} f(x)$

g. $f(4)$

h. $\lim_{x \rightarrow 4} f(x)$



- 11) Given the function $f(x) = \begin{cases} 2x + 4, & x < -2 \\ x^2 - 4, & -2 \leq x < 2 \\ 4, & x \geq 2 \end{cases}$ Find the following limits.

a) $\lim_{x \rightarrow -2} f(x)$

b) $\lim_{x \rightarrow 2} f(x)$

- 12) Let f be a function defined by $f(x) = \begin{cases} x^2 - 2, & x < 1 \\ -x, & x \geq 1 \end{cases}$
Show that f is continuous at $x = 1$

- 13) Use the Intermediate Value Theorem to show that for $f(x) = x^3 - 5$ there is at least one x -value on the interval $[-2, 2]$ where $f(x) = 0$

- 14) State the functions vertical asymptotes, horizontal asymptotes and holes.

$$f(x) = \frac{x^2 - x - 12}{x^2 - 9}$$