

AP Calc Warm Up – 9/21/10

Name: _____

Period: _____

1) Find the following limits.

a. $\lim_{x \rightarrow \infty} \frac{1}{x+8} =$

b. $\lim_{x \rightarrow \infty} \frac{x^2 - 9}{x - 3} =$

c. $\lim_{x \rightarrow \infty} \frac{x^2 - 2x - 15}{x^3 + 4x^2 + 12} =$

d. $\lim_{x \rightarrow \infty} \frac{6x^2 - 12x + 38}{-2x^2 - 18} =$

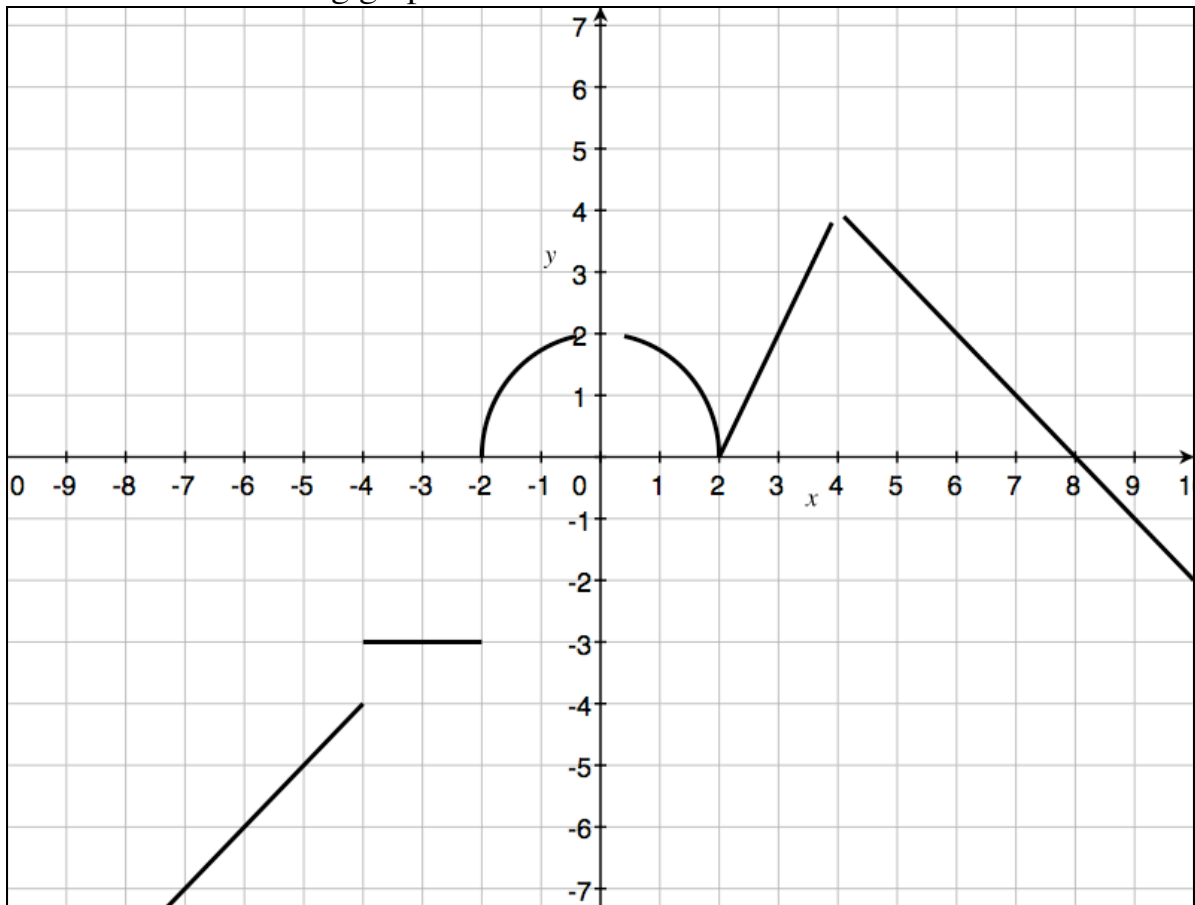
AP Calc

Left and Right Hand Limits

Name: _____ Date: _____ Period: _____

Students will know left and right-hand limit notation and will be able to find left and right-hand limits for piecewise functions.

Consider the following graph:



At $x=-4$ we have said that the limit does not exist but imagine if we could consider the two sides separately. What would be the limit of the left hand side? What would be the limit of the right hand side?

Limit notation:

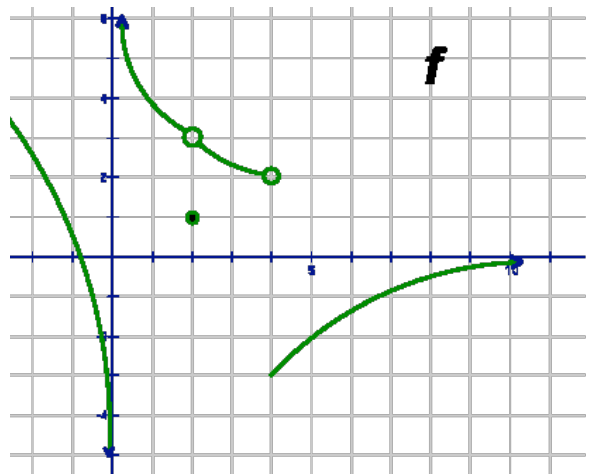
Use the graph to answer questions 1 – 4.

1) $\lim_{x \rightarrow 2} f(x) =$

2) $\lim_{x \rightarrow 4^+} f(x) =$

3) $\lim_{x \rightarrow 4^-} f(x) =$

4) $\lim_{x \rightarrow 0} f(x) =$



Let's look at the right hand and left-hand limits analytically:

Consider $f(x) = \begin{cases} x^2, & x < 2 \\ -3x + 7, & x \geq 2 \end{cases}$

Find:

$$f(2)$$

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

$$\lim_{x \rightarrow 2^+} f(x)$$

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

Practice

1) Let f be the function defined by

$$f(x) = \begin{cases} \sqrt{x+1} & \text{for } 0 \leq x \leq 3 \\ 3-x & \text{for } 3 < x \leq 5 \end{cases}$$

(a) Find $f(3)$.

(b) Find $\lim_{x \rightarrow 3^+} f(x)$ and $\lim_{x \rightarrow 3^-} f(x)$.

2) Find the following limits.

a. $\lim_{x \rightarrow 0^-} \frac{1}{x} =$

b. $\lim_{x \rightarrow 0^-} \frac{1}{x} =$

For c. and d. consider the function $f(x) = \begin{cases} -x^2, & x < 3 \\ 2^x, & x > 3 \end{cases}$

c. $\lim_{x \rightarrow 3^-} f(x) =$

d. $\lim_{x \rightarrow 3^+} f(x) =$

Some AP Problems

The graph of the function f is shown to the right.

Which of the following statements is false?

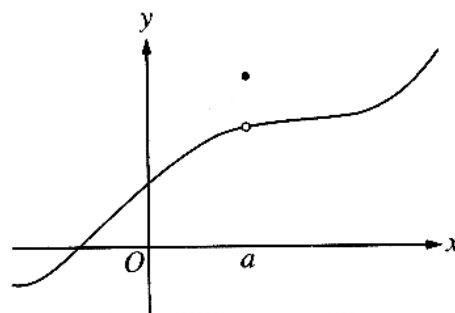
a) $x = a$ is in the domain of f .

b) $\lim_{x \rightarrow a^+} f(x)$ is equal to $\lim_{x \rightarrow a^-} f(x)$

c) $\lim_{x \rightarrow a} f(x)$ exists

d) $\lim_{x \rightarrow a}$ is not equal to $f(a)$

e) f is continuous at $x = a$



AP Calc – Exit Slip – 9/21/10

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1) Find the following limits if $f(x) = \begin{cases} 2x+5, & x < 3 \\ -4, & x = 3 \\ x^2, & x > 3 \end{cases}$:

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

b. $\lim_{x \rightarrow 3^+} f(x) =$