Limits Involving Infinity (Answer Equals Infinity)

Step 1: Substitute the value into limit.
Step 2: If the value is approaching from the left, choose a value to the left.
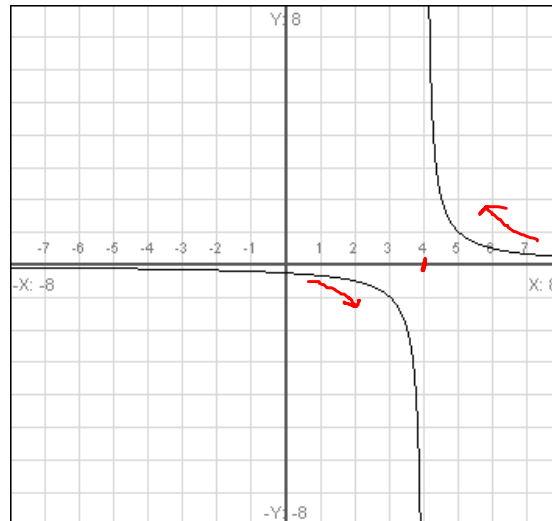   If the value is approaching from the right, choose a value to the right.
Step 3: The answer is either negative infinity or positive infinity, depending on the signs.

Directions: Evaluate each limit.

1) $\displaystyle\lim_{x\to 4^-}\frac{1}{x-4} =$ $\frac{1}{4-4} = \frac{1}{0} = \frac{1}{3.9-4} = \frac{1}{-.1} = \boxed{-\infty}$

2) $\displaystyle\lim_{x\to 4^+}\frac{1}{x-4} =$ $\frac{1}{4.1-4} = \frac{1}{0} = \frac{1}{4.1-4} = \frac{1}{.1} = \boxed{\infty}$

3) $\displaystyle\lim_{x\to 4}\frac{1}{x-4} =$ $\boxed{\text{Does Not exist}}$

4) $\displaystyle\lim_{x\to -2^-}\frac{1}{(x+2)^3} =$ $\frac{1}{(-2+2)^3} = \frac{1}{0^3} = \frac{1}{0} \subseteq \frac{1}{(-2.1+2)^3} = \frac{1}{(-.1)^3} = \frac{+}{-} = \boxed{-\infty}$

5) $\displaystyle\lim_{x\to 2^+}\frac{x-3}{x-2} =$ $\frac{2-3}{2-2} = \frac{-1}{0} = \frac{2.1-3}{2.1-2} = \frac{-}{+} = \boxed{-\infty}$

6) $\lim\limits_{x \to -1^-} \dfrac{x}{1-x^2} =$ $\dfrac{-1}{1-(-1)^2} = \dfrac{-1}{1-1} = -\dfrac{1}{0}$

$\lim\limits_{x \to -1^-} \dfrac{x}{(1+x)(1-x)} = \dfrac{-1.1}{(1+-1.1)(1++1.1)} = \dfrac{-}{(-)(+)} = \dfrac{-}{-} = \boxed{\infty}$

7) $\lim\limits_{x \to 4^-} \dfrac{3-x}{x^2-2x-8} =$ $\dfrac{3-4}{4^2-2(4)-8} = \dfrac{-1}{16-8-8} = \dfrac{-1}{0}$

$\lim\limits_{x \to 4^-} \dfrac{3-x}{(x-4)(x+2)} = \dfrac{3-3.9}{(3.9-4)(3.9+2)} = \dfrac{-}{(-)(+)} = \dfrac{-}{-} = \boxed{\infty}$