

Worksheet 2, Thursday, September 13, 2012

Carefully compute the following limits. Be clear if the limit equals a value, **Does Not Exist**, or is $+\infty$ or $-\infty$. Always justify your reasoning and show all work.

1.
$$\lim_{x \rightarrow 2} \frac{x^2 + 6x + 8}{x + 2}$$

2.
$$\lim_{x \rightarrow 2} \frac{x^2 + 6x + 8}{x - 2}$$

3.
$$\lim_{x \rightarrow 2} \frac{x^2 - 6x + 8}{x - 2}$$

4.
$$\lim_{t \rightarrow 0} \left(\frac{1}{t\sqrt{1+t}} - \frac{1}{t} \right)$$

5.
$$\lim_{t \rightarrow 1} \frac{t - 1}{g(t^2) - 3}, \text{ where } g(t) = 2t + 1$$

6.
$$\lim_{x \rightarrow 0} \frac{x + 1}{x^2(x + 2)}$$

7.
$$\lim_{x \rightarrow 2} \frac{x - 2}{x^2 - 4x + 12}$$

8.
$$\lim_{x \rightarrow 2} \frac{\frac{x}{x-1} - \frac{x+2}{x}}{x-2}$$

9.
$$\lim_{x \rightarrow 0} \left(\frac{1}{x} - \frac{1}{|x|} \right)$$

10.
$$\lim_{x \rightarrow -4^-} \frac{|x + 4|}{x + 4}$$

11.
$$\lim_{x \rightarrow -1} \frac{|x| - 1}{1 - x^2}$$

12. Let $g(x) = \sqrt{x}$. Compute $\lim_{s \rightarrow 1} \frac{g(s^2 + 8) - 3}{s - 1}$

13. Let $f(x) = \frac{1}{x}$. Compute $\lim_{t \rightarrow 2} \frac{f(t - 1) - 2f(t)}{t^2 - 4}$

Please Turn Over

14. Consider the function defined by

$$f(x) = \begin{cases} \sqrt{x-4} & \text{if } x > 4 \\ 8-2x & \text{if } x < 4 \end{cases}$$

Determine whether $\lim_{x \rightarrow 4} f(x)$ exists? Why or why not?

Turn in your solutions.