

# Math 157 - Quiz 4

September 11, 2013

Name key

Score \_\_\_\_\_

Find each limit. Use  $+\infty$ ,  $-\infty$ , or DNE if appropriate. Show all work to receive full credit. Supply explanations when necessary.

1. (2 points)  $\lim_{x \rightarrow 5} \frac{x^2 - 3x - 10}{x^2 - 6x + 5}$  %

$$= \lim_{x \rightarrow 5} \frac{(x-5)(x+2)}{(x-5)(x-1)} = \lim_{x \rightarrow 5} \frac{x+2}{x-1} = \boxed{\frac{7}{4}}$$

2. (2 points)  $\lim_{x \rightarrow 3} \frac{5x+2}{x-3}$  17/0  $\rightarrow$  UNBOUNDED!

$$\left. \begin{array}{l} \lim_{x \rightarrow 3^-} \frac{5x+2}{x-3} \quad \frac{+}{-} = - \\ \lim_{x \rightarrow 3^+} \frac{5x+2}{x-3} \quad \frac{+}{+} = + \end{array} \right\} \begin{array}{l} \text{LIMIT FROM LEFT IS } -\infty \\ \text{LIMIT FROM RIGHT IS } +\infty \end{array} \left. \vphantom{\lim_{x \rightarrow 3^-}} \right\} \boxed{\text{LIMIT DNE}}$$

3. (2 points)  $\lim_{x \rightarrow 1} \frac{x^2+1}{x^2+4x+3}$

$$= \frac{2}{8} = \boxed{\frac{1}{4}}$$

4. (2 points)  $\lim_{x \rightarrow -1^+} g(x)$  if  $g(x) = \begin{cases} 5x^2 - 7, & x \leq -1 \\ 3x + 8, & x > -1 \end{cases}$

$$\lim_{x \rightarrow -1^+} g(x) = \lim_{x \rightarrow -1^+} (3x + 8) = \boxed{5}$$

5. (2 points)  $\lim_{x \rightarrow 0^+} \frac{2x}{\sqrt{x+1}-1}$  %

$$\frac{\sqrt{x+1}+1}{\sqrt{x+1}+1} = \lim_{x \rightarrow 0^+} \frac{2x(\sqrt{x+1}+1)}{x+1-1}$$

$$= \lim_{x \rightarrow 0^+} \frac{2x(\sqrt{x+1}+1)}{x} = \lim_{x \rightarrow 0^+} 2(\sqrt{x+1}+1)$$

$$= \boxed{4}$$