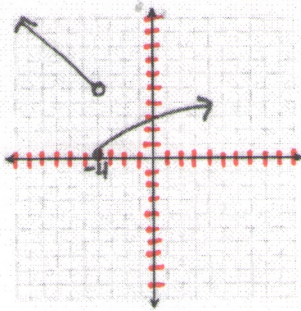Name: _____

Date: _____ Per: _____

You may not use a calculator... Good Luck!

1. Evaluate the following limits by using the graph of the function

(a) $\lim_{x \to -4^+} f(x) =$

(b) $\lim_{x \to -4^-} f(x) =$

(c) $\lim_{x \to -4} f(x) =$

2. Suppose you are given $\lim_{x \to c} f(x) = -7$ and $\lim_{x \to c} g(x) = 14$, calculate the following limits:

(a) $\lim_{x \to c} [f(x)g(x)] =$

(b) $\lim_{x \to c} -9f(x) =$

(c) $\lim_{x \to c} \frac{f(x)}{g(x)} =$

(d) $\lim_{x \to c} g(x)^2 =$

Evaluate the following limits

3. $\lim_{x \to 0} \frac{-2(1-\cos x)}{x}$

4. $\lim_{x \to 0^-} x^4 - \frac{1}{x}$

5. $\lim_{x \to \pi} \tan\left(\frac{5x}{6}\right)$

6. $\lim_{x \to -3} \frac{5x+15}{x^2-2x-15}$

7. $\lim_{x \to 4^+} \sqrt{16 - x^2}$

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

9. $\lim_{x \to 0} \frac{\sin(3x)\cos(x)}{3x}$

10. $\lim_{\Delta x \to 0} \frac{(x+\Delta x)^2-(x+\Delta x)-6-(x^2-x-6)}{\Delta x}$

Discuss the continuity of each function. Be sure to clearly justify your answers. If there is discontinuity, specify whether it is removable or not, and where it occurs.

11. $f(x) = \dfrac{x^2-25}{x^2-15x+50}$	
12. $f(x) = \begin{cases} 3-x, & x \neq 1 \\ 0, & x = 1 \end{cases}$	
13. $f(x) = \sin(x) - 4x^2$	

14. Find the value of a such that $f(x) = \begin{cases} 5, & x \leq 3 \\ ax - 7, & x > 3 \end{cases}$ is everywhere continuous.

15. Use the Intermediate Value Theorem to show that $f(x) = 2x^3 - 5x^2 - 10x + 5$ has a zero in the interval $[-1,2]$.