NAME ____ DATE ________________________ PD ________

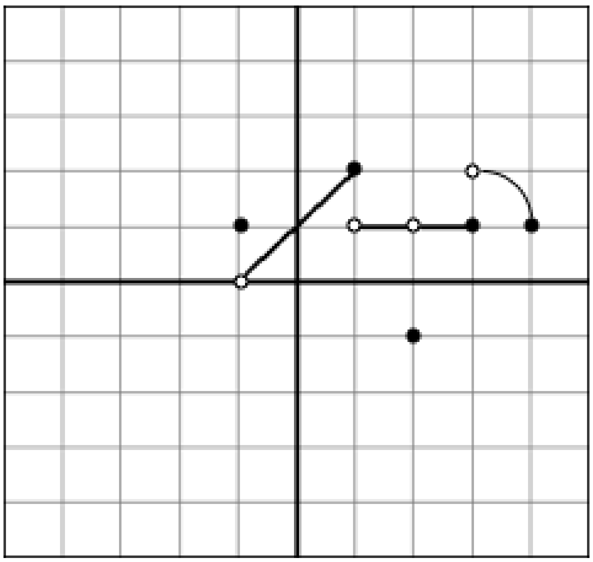
Pre-Calculus Limits Review

1) List the 3 ways that a limit may not exist. Draw a picture of each situation.

2) List the ways that a function may be discontinuous. Draw a picture of each situation.

3) What is the definition of continuity?

4) Suppose $\lim_{x\to 4} f(x) = 2$ and $\lim_{x\to 4} g(x) = -5$, find the $\lim_{x\to 4} 3[f(x) - 2g(x)]$



5) True or False

a) $\lim_{x\to 2} f(x) = -1$

b) $\lim_{x\to -1^+} f(x) = 1$

c) $\lim_{x\to 1^+} f(x) = 1$

d) $\lim_{x\to 2} f(x)$ exists

e) $\lim_{x\to 3} f(x) = 1$

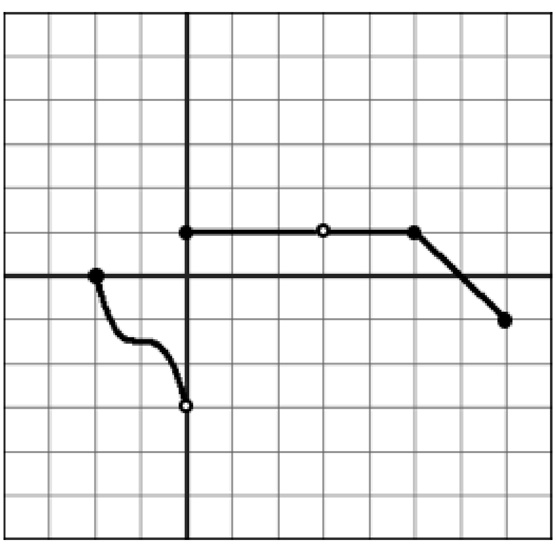
f) $\lim_{x\to 1} f(x)$ DNE

g) $\lim_{x\to 3^-} f(x) = 1$

h) $\lim_{x\to 0} f(x)$ exists

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

j) $\lim_{x\to 0^+} f(x) = \lim_{x\to 0^-} f(x)$



6) Find each limit.

a) $\lim_{x\to 3} f(x) =$

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

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

d) $f(3) =$

e) $\lim_{x\to 0} f(x) =$

f) $\lim_{x\to 0^-} f(x) =$

g) $\lim_{x\to 0^+} f(x) =$

h) $f(0) =$

i) $\lim_{x\to 5} f(x) =$

j) $\lim_{x\to 5^+} f(x) =$

k) $\lim_{x\to 5^-} f(x) =$

l) $f(5) =$

Evaluate each limit:

1) $\lim_{x\to 9} x$

2) $\lim_{x\to 0} 6$

3) $\lim_{x\to 1}\left(12x^3+x^2-1\right)$

4) $\lim_{x\to -5}\left(3(x-1)\right)$

5) $\lim_{x\to 5}\frac{x+1}{x+2}$

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

7) $\lim_{x\to -3}\frac{2x+1}{x-3}$

8) $\lim_{x\to 0}\frac{x}{x^2-3x}$

9) $\lim_{x\to -7}\frac{x+7}{x^2-49}$

10) $\lim_{x\to \pi}\left(\cos x\sin x\right)$

11) $\lim_{x\to 0}\frac{(x-6)^2-36}{x}$

12) $\lim_{x\to 4}\frac{4-x}{2-\sqrt{x}}$

13) $\lim_{x\to 2}\left(x^2-x+2\right)$

14) $\lim_{x\to -3}\frac{x^2-2x}{x}$

15) $\lim_{x\to -1}\frac{x^2-1}{x+1}$

16) $\lim_{x\to -1}\frac{2x^2-x-3}{x+1}$

17) $\lim_{x\to 3}\frac{\sqrt{x+1}-2}{x-3}$

18) $\lim_{x\to 0}\frac{\sin 6x}{2x}=$

19) $\lim_{x\to 4}\frac{3}{x-4}$

20) $\lim_{x\to -2} f(x),\quad f(x)=\begin{cases}-x^2+4, & x>-2\\ 3x+6, & x<-2\end{cases}$

21) $\lim_{x\to 4} f(x),\quad f(x)=\begin{cases}\frac{1}{2}x-1, & x\geq 4\\ 2x-1, & x<4\end{cases}$

22) $\lim_{x\to\infty}\frac{8x-2}{5-4x}=$

23) $\lim_{x\to\infty}\frac{8-\frac{2}{x^2}}{\frac{7}{x^3}-4}=$

24) $\lim_{x\to -\infty}\frac{3-4x-x^2}{x+1}$

25) $\lim_{x\to\infty}\frac{6x^2-9}{x^3-12x+3}$

26) Using the definition of continuity, determine if the function from #20 is continuous.

27) Using the definition of continuity, determine if the function from #21 is continuous.

28) Find the value of k that makes the function continuous at $x=5$: $f(x)=\begin{cases}x^2 & x\geq 5\\ x+k & x<5\end{cases}$

29) Find the value of k that makes the function continuous at $x=-6$: $f(x)=\begin{cases}kx+8 & x\leq -6\\ -9x+k & x>-6\end{cases}$