Assignment: G2 – 4 points
First point in class Tue, Jan 15
Second point in class Thur, Jan 17
Third point in class Tue, Jan 22
Fourth (individual) point due Thur, Jan 24

Names: ______________________
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(1) $\lim_{x\to 0} \frac{x}{\sqrt{x+1}-1} =$

(2) $\lim_{x\to \frac{1}{2}^-} \frac{|2x-1|}{2x-1} =$

(3) $\lim_{x\to 3} \sqrt{x-3} =$

(4) $\lim_{x\to 3^+} \sqrt{x-3} =$

(5) $\lim_{x\to 1} \frac{1-a^2}{1-a} =$

(6) $\lim_{a\to 4} \frac{2-\sqrt{a}}{4-a} =$

(7) $\lim_{x\to 2} \frac{8-a^3}{2-a} =$

(8) $\lim_{x\to 1} \frac{1-\frac{1}{a}}{1-a} =$

Use the graph on the right to answer problems 9 – 15

(9) $\lim_{x\to -1} g(x) =$ ______

(10) $\lim_{x\to 1} g(x) =$ ______

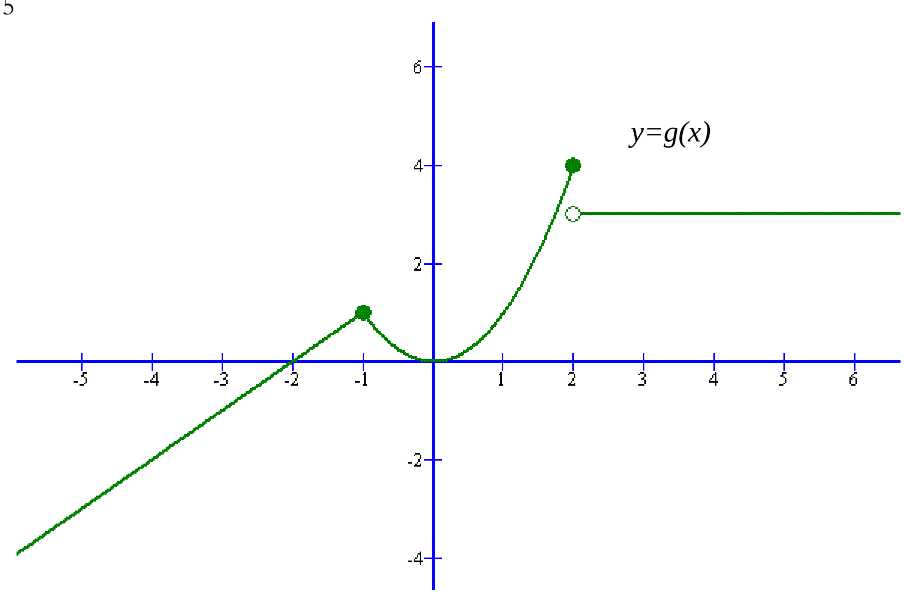
(11) $\lim_{x\to 2^-} g(x) =$ ______

(12) $\lim_{x\to 2^+} g(x) =$ ______

(13) $\lim_{x\to 2} g(x)$ ______

(14) $\lim_{x\to \infty} g(x) =$ ______

(15) $\lim_{x\to -\infty} g(x) =$ ______



(16) Draw the graph of a single function that has all of these properties:

- *f(x)* = 0 when x ≤ - 4
- $\lim_{x\to -4^+} f(x) = 2$
- $\lim_{x\to 0} f(x) = 0$
- *f(0) = 2*
- $\lim_{x\to \infty} f(x) = 2$

(17) Draw the graph of a single function that has all of these properties:

- *f(x)* is continuous everywhere except where $x = 0$
- $\lim_{x \to 0} f(x) = 0$
- $f(0) = 2$
- $\lim_{x \to \infty} f(x) = 0$
- $\lim_{x \to -\infty} f(x) = 0$

(18) Graph the function $g(x) = \begin{cases} -x+3, & \text{if } x < -2 \\ 3, & \text{if } -2 \le x \le 2 \\ x-1, & \text{if } x > 2 \end{cases}$ below. Then, identify and classify all discontinuities.

(19) Find the value of *a* that makes *g(x)* a continuous function $g(x) = \begin{cases} -x+a, & \text{if } x < 0 \\ 1, & \text{if } x = 0 \\ x+a, & \text{if } x > 0 \end{cases}$

Then, graph $y = g(x)$.

(20) Find values of *a* and *b* that makes *f(x)* a continuous function: $f(x) = \begin{cases} 3x^2 - 1, & \text{if } x \ge -1 \\ ax+b, & \text{if } x < -1 \end{cases}$

Then, graph $y = f(x)$.

(21) Identify the formula of a piecewise function, *f(x)*, with all of the following properties:

- *f(x)* has a jump discontinuity at $x = -4$
- $\lim_{x \to -4^+} f(x) = 3$
- *f(x)* has a removable discontinuity at $x = 4$
- $\lim_{x \to 4} f(x) = 3$
- $f(0) = 0$
- $\lim_{x \to \pm\infty} f(x) = \infty$

(22) Compute these limits:

a. $\lim_{x \to -\infty} \frac{2x^3-1}{x^2+1} =$

b. $\lim_{x \to \infty} \frac{2x^3-1}{x^2+1} =$

c. $\lim_{x \to -\infty} \frac{2x^3-1}{x^3+1} =$

d. $\lim_{x \to \infty} \frac{2x^3-1}{x^3+1} =$

e. $\lim_{x \to -\infty} 1 - x^4 =$

f. $\lim_{x \to \infty} 1 - x^4 =$

g. $\lim_{x \to 4^+} \frac{1}{2x-8} =$

h. $\lim_{x \to 4^-} \frac{1}{2x-8} =$

i. $\lim_{x \to 4} \frac{1}{2x-8} =$

j. $\lim_{x \to 1} \frac{x+1}{x-1} =$

k. $\lim_{x \to -\frac{1}{2}^+} \frac{x^2-2x-3}{2x^2-3x-2} =$

l. $\lim_{x \to -\frac{1}{2}^-} \frac{x^2-2x-3}{2x^2-3x-2} =$

m. $\lim_{x \to -\frac{1}{2}} \frac{x^2-2x-3}{2x^2-3x-2} =$

n. $\lim_{x \to 2} \frac{x^2-3x+2}{x^2-4x+4} =$

(23) Identify the formula of a rational function, *f(x)*, with all of the following properties:

- $\lim_{x \to \infty} f(x) = 0$
- $\lim_{x \to -\infty} f(x) = 0$
- $\lim_{x \to 2^+} f(x) = -\infty$
- $\lim_{x \to 2^-} f(x) = \infty$

(24) Identify the formula of a rational function, *f(x)*, with all of the following properties:

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