Warm Up

1) Find the value of c that would make the function continuous:

a. $f(x) = \begin{cases} 2x^2 - 3x, & x < \underline{4} \\ -6x + c, & x \geq \underline{4} \end{cases}$

b. $f(x) = \begin{cases} -5x + c, & x \leq -2 \\ |3x - 4|, & x > -2 \end{cases}$

$2(4)^2 - 3(4) = -6(4) + c$

$-5(-2) + c = |3(-2) - 4|$

$20 = -24 + c$

$10 + c = 10$

$\underline{+24 \qquad +24}$

$\underline{-10 \qquad -10}$

$\boxed{44 = c}$

$\boxed{c = 0}$

**2) Six chairs are set in a circle. How many ways could they be arranged?**

$$\frac{6!}{6} = \boxed{120}$$

3) Nina is taking a quiz. There are 6 questions, and she thinks there is a 60% chance of answering correct. What is the probability that she answers exactly 2 questions wrong?

$$_6C_2 \, (0.6)^4 (0.4)^2 = \boxed{0.311}$$

7. $f(x) = \begin{cases} -3x - 4, & x \le -2 \\ x + 1, & x > -2 \end{cases}$
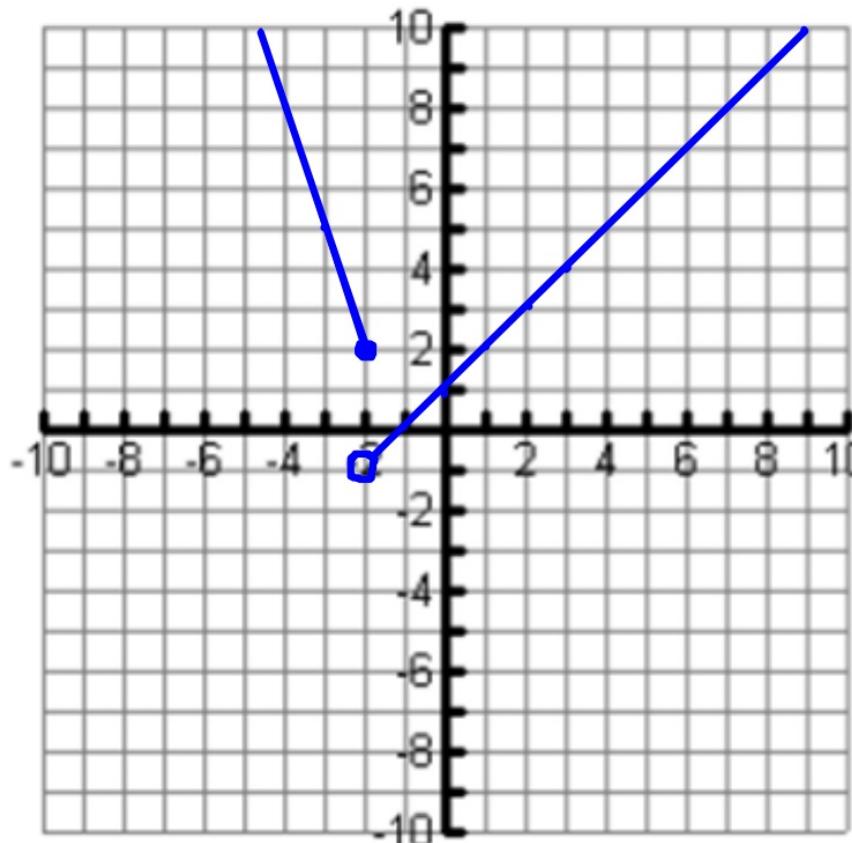
f(-4) = __8__

f(0) = __1__

f(6) = __7__

Continuous?

Yes / ~~No~~

Domain: __ℝ__

Range: __$y > -1$__

8. $f(x) = \begin{cases} -x, & x \leq 0 \\ 2x - 2, & x > 0 \end{cases}$
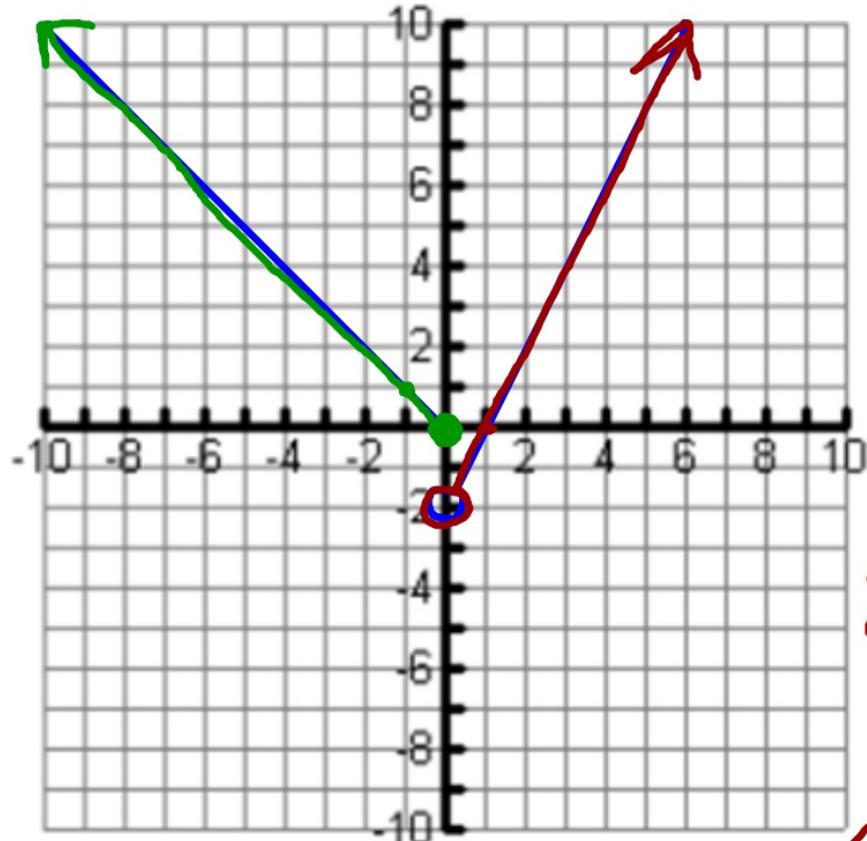
$(0,0)$

$-0 = 0$

$(-1, 1)$

$-(-1) = 1$

$(0, -2)$

$2(0) - 2$

$(1, 0)$

$2(1) - 2 = 0$

f(-3) = **3**

f(0) = **0**

f(8) = **14**

Continuous?

Yes / **No**

Domain: $\mathbb{R}$

Range: $y > -2$

9. $f(x) = \begin{cases} -x - 4, & x < -2 \\ -\dfrac{1}{2}x, & -2 \le x \le 2 \\ -1, & x > 2 \end{cases}$
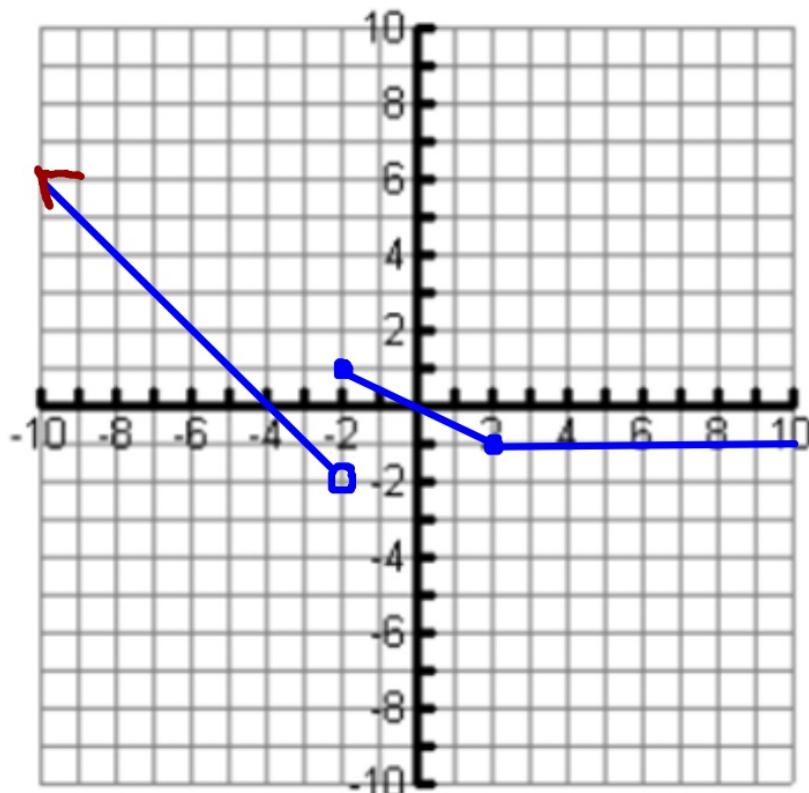
f(-5) = ___1___

f(2) = ___-1___

f(25) = ___-1___

Continuous?

Yes / (No)

Domain: ___ℝ___

Range: ___y > -2___

10. $f(x) = \begin{cases} 3, & x < -1 \\ x + 1, & 1 \le x \le 4 \end{cases}$
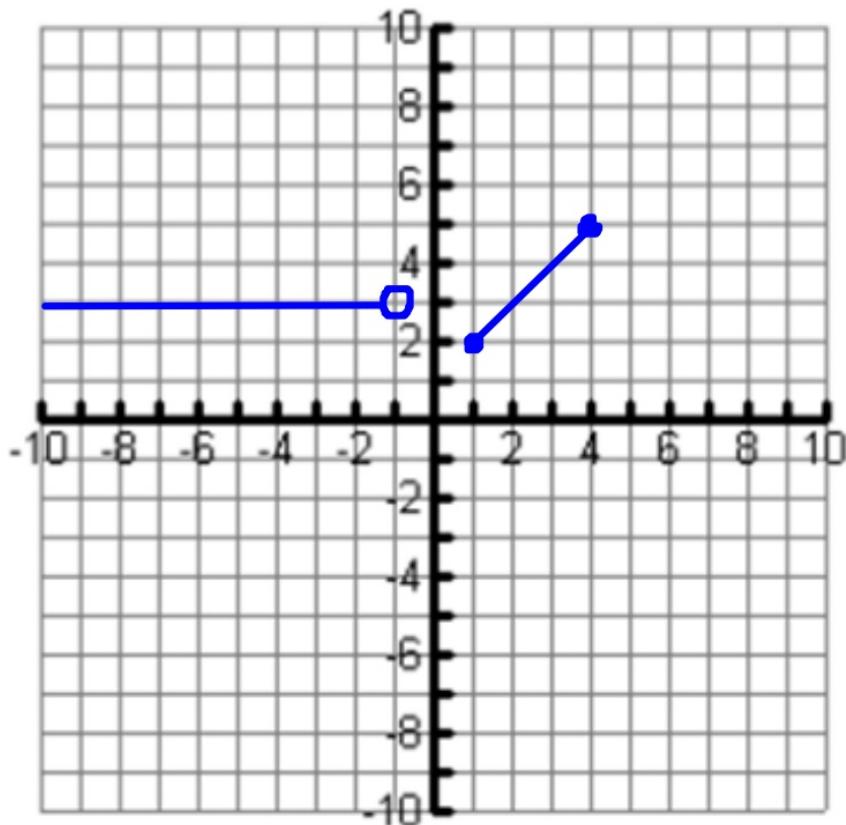
f(-6) = __3__

f(2) = __3__

f(7) = __∅__

Continuous?

Yes (No)

$x < -1$ or $1 \le x \le 4$

Domain: $(-\infty, -1) \cup [1, 4]$

$2 \le y \le 5$ **Range:** $[2, 5]$

11. $f(x) = \begin{cases} \frac{1}{2}x - 1, & x \neq 4 \\ 3, & x = 4 \end{cases}$
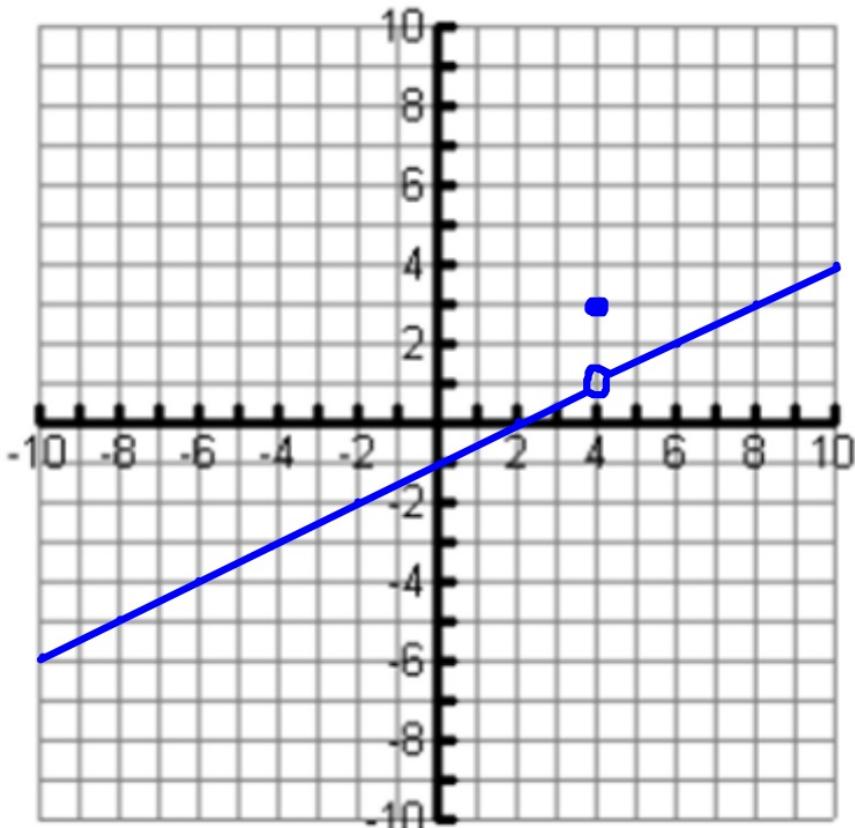
f(0) = ___−1___

f(4) = ___3___

f(18) = ___8___

Continuous?

Yes / ⟨No⟩

Domain: ___ℝ___

Range: ___$y \neq 1$___

12. $f(x) = \begin{cases} x + 4, & -6 \le x < 2 \\ -6, & x = 2 \\ -x + 2, & x > 2 \end{cases}$
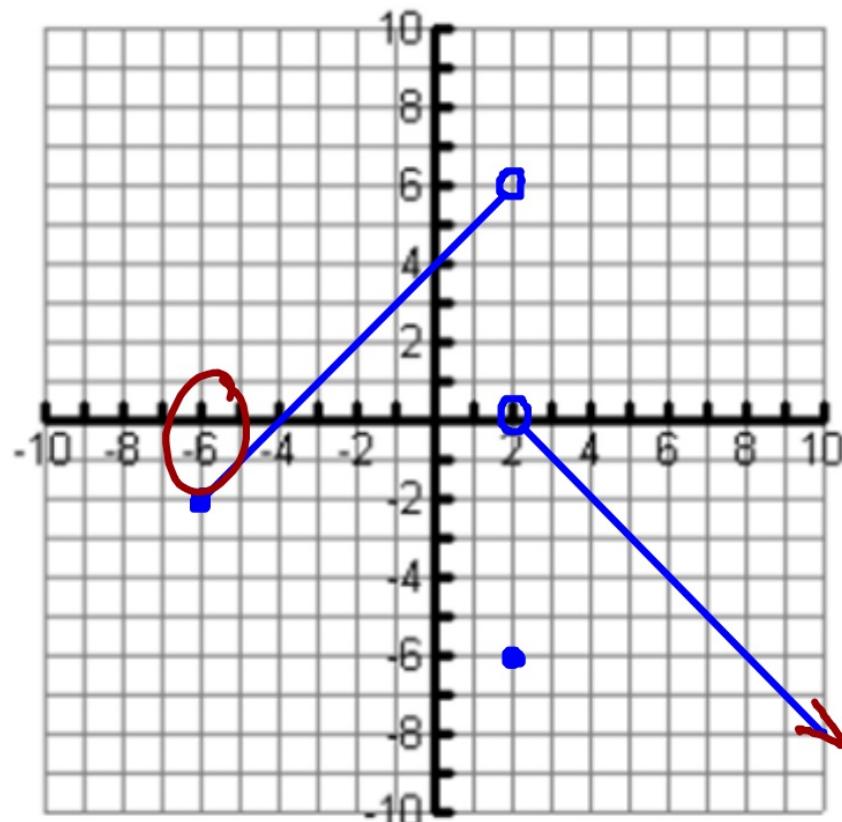
f(-8) = ⌀

f(-3) = 1

f(12) = -10

Continuous?

Yes / ~~No~~

Domain: $x \ge -6$

Range: $y < 6$

1) $f(x) = \begin{cases} 3x + 2, x \le -4 \\ -4, x > -4 \end{cases}$

$f(-6) = $ **-16**

$f(-4) = $ **-10**

$f(2) = $ **-4**

2) $f(x) = \begin{cases} -2x - 4, x \ge 3 \\ x + 4, x < 3 \end{cases}$

$f(1) = $ **5**

$f(3) = $ **-10**

$f(5) = $ **-14**

3) $f(x) = \begin{cases} -2x - 5, x \le 2 \\ \frac{1}{2}x + 5, x > 2 \end{cases}$

$f(0) = $ **-5**

$f(2) = $ **-9**

$f(4) = $ **7**

4) $f(x) = \begin{cases} 3, x \le -2 \\ -2 - 4x, -2 < x < 3 \\ x^2 - 1, x \ge 3 \end{cases}$

$f(-5) = $ **3**

$f(1) = $ **-6**

$f(3) = $ **8**

5) $f(x) = \begin{cases} x + 7, x \ge 4 \\ -2x, 0 \le x < 4 \\ 5, x < 0 \end{cases}$

$f(-6) = $ **5**

$f(4) = $ **11**

$f(8) = $ **15**

6) $f(x) = \begin{cases} -3x + 1, x \le 6 \\ \frac{2}{3}x + 3, x > 6 \end{cases}$

$f(-2) = $ **7**

$f(6) = $ **-17**

$f(9) = $ **9**

Unit 5: Functions

Review

Functions

Transformations

Domain & Range

Intervals

Extrema

End Behavior

Function Value

Continuous

Graphing

1) $f(x) = (x - 3)^2 - 4$

a. Type **Quadratic**

b. Transformation(s) **Right 3, Down 4**

c. Graph

d. Domain $\mathbb{R}$

e. Range $y \geq -4$

f. Extrema ✓

g. Positive Interval $(-\infty, 1) \cup (5, \infty)$

h. Increasing Interval $(3, \infty)$

i. End Behavior

as $x \to -\infty, f(x) \to \infty$

as $x \to \infty, f(x) \to \infty$

Abs. Min
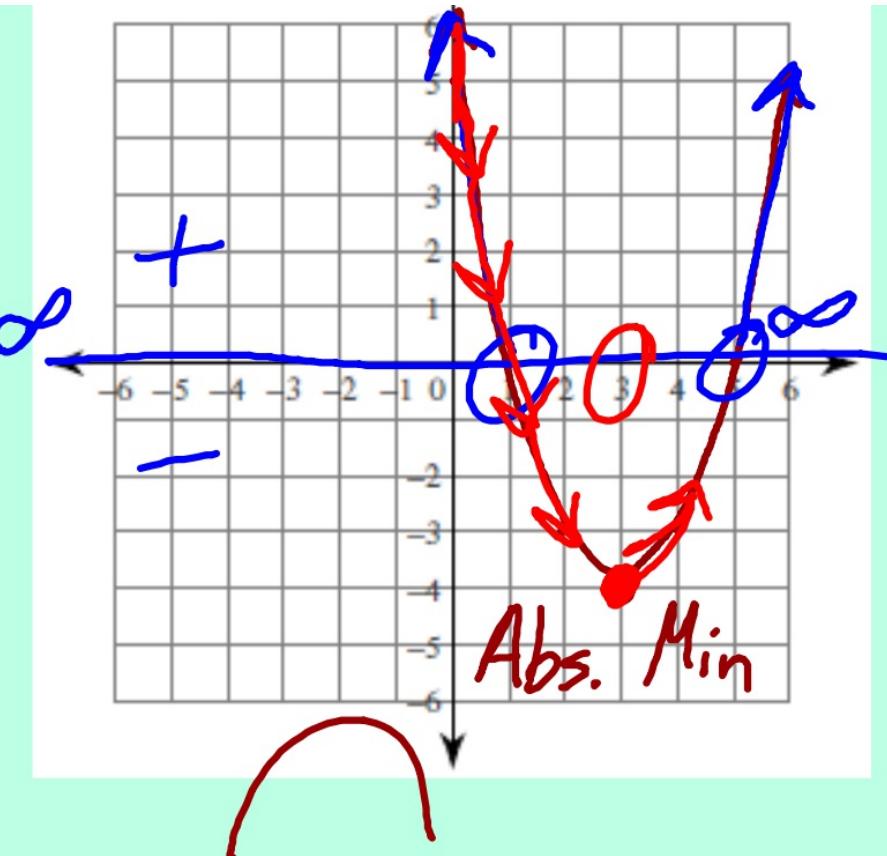
2) $f(x) = -|x + 2| + 3$

a. Type Abs Value

b. Transformation(s)
Ref, Left 2, Up 3

c. Graph

**d. Domain** $\mathbb{R}$

e. Range $y \leq 3$

f. Extrema ✓

g. Positive Interval
$(-5, 1)$

h. Increasing Interval
$(-\infty, -2]$

Abs Max
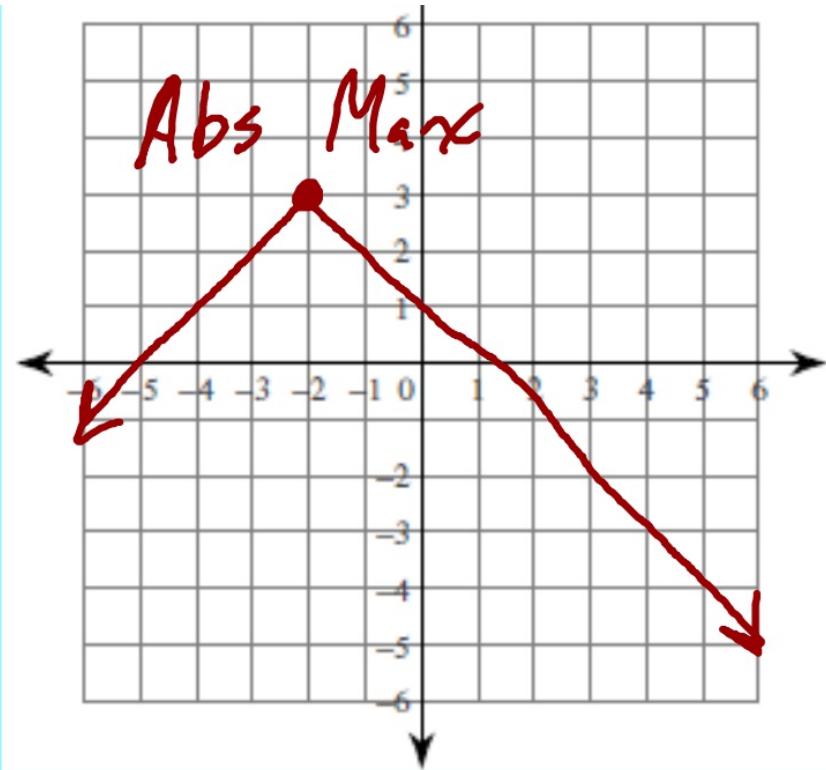
i. End Behavior
as $x \to -\infty$, $f(x) \to -\infty$
as $x \to \infty$, $f(x) \to -\infty$

3) $f(x) = (x + 4)^3 + 1$

a. Type Cubic

b. Transformation(s)
Up 1, Left 4

c. Graph

d. Domain $\mathbb{R}$

e. Range $\mathbb{R}$

f. ~~Extrema~~ Critical Points

g. Positive Interval
$(-5, \infty)$

h. Increasing Interval
$(-\infty, \infty)$

POI
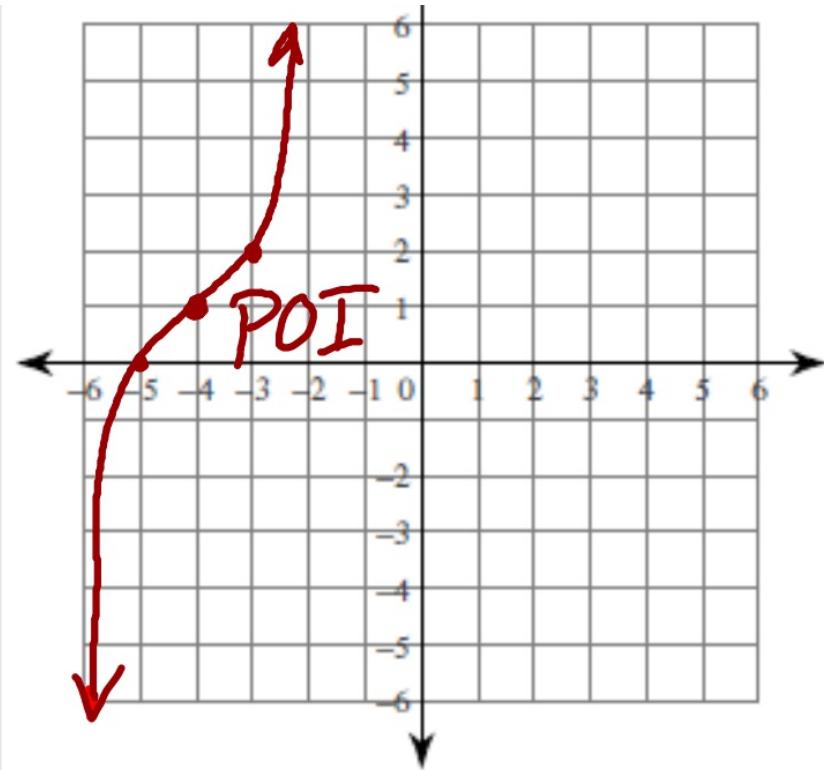
i. End Behavior
as $x \to -\infty$, $f(x) \to -\infty$
as $x \to \infty$, $f(x) \to \infty$

$$f(x) = \begin{cases} 2x+6, & x < -2 \\ x^2-2, & -2 \le x < 1 \\ -x+4, & x \ge 1 \end{cases}$$

Graph:

(-2, 2)   (-2, 2)   (1, 3)

2(-2)+6=   (-2)²-2=   -1+4=

(-3, 0)   (1, -1)   (2, 2)

2(-3)+6=   1²-2=-1   -2+4=

Continuous? No

Domain: $\mathbb{R}$

Range: $y \le 3$
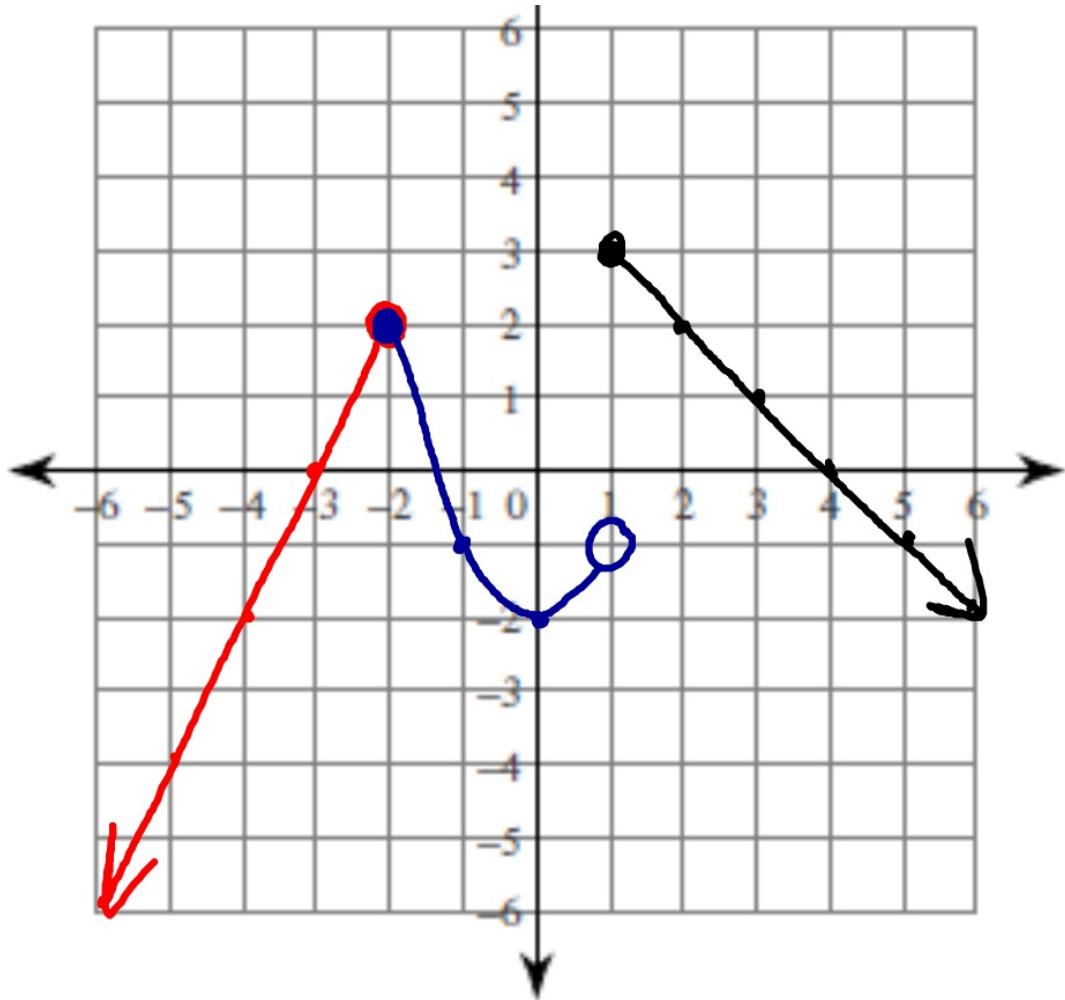
f(-4) = -2

f(2) = 2

f(5) = -1

5) $f(x) = \sqrt{x + 5} - 2$

a. Type Sq. Root

b. Transformation(s)

c. Graph

**d. Domain** $x \geq -5$

e. Range $y \geq -2$

f. ~~Extrema~~

g. Positive Interval $(-1, \infty)$

h. Increasing Interval $[-5, \infty)$
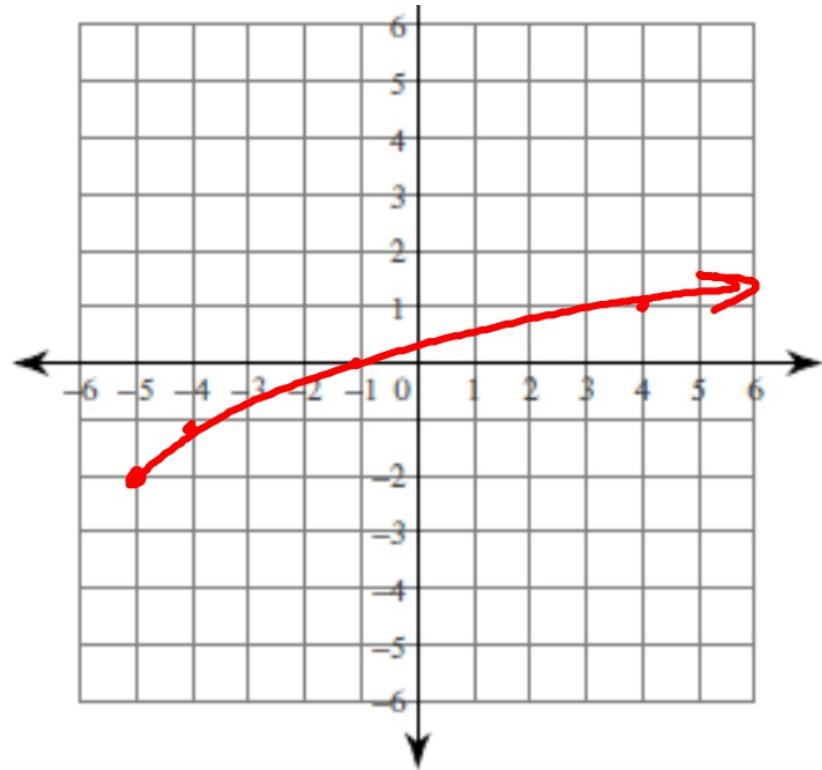
6) $f(x) = \dfrac{1}{x+2} - 1$

a. Type   *Rational*

b. Transformation(s)

c. Graph

d. Domain $x \neq -2$

e. Range $y \neq -1$

$$(-\infty, -1) \cup (-1, \infty)$$
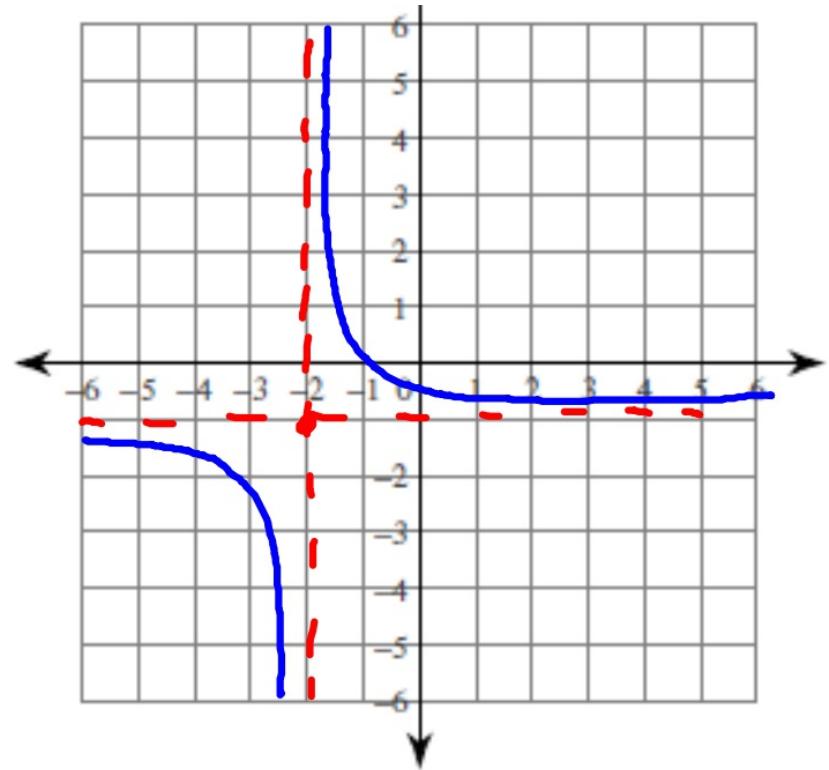
Assignment::
Study All of Unit 5

WB 507 + Piecewise