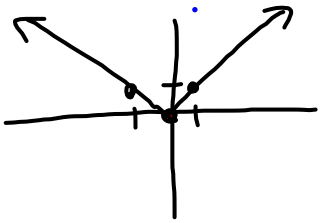
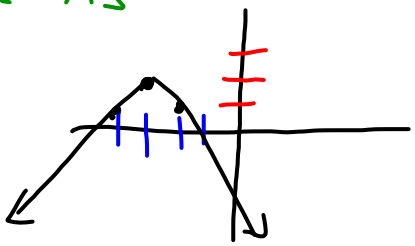
Bellwork: Graph the transformation of |x|

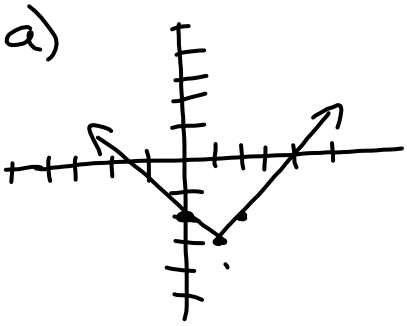
$f(x) = -|x+3|+2$



1. shift up 2
2. reflect over x-axis
3. shift left 3



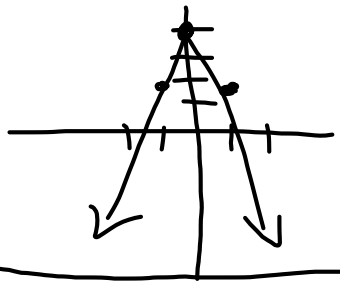
a)

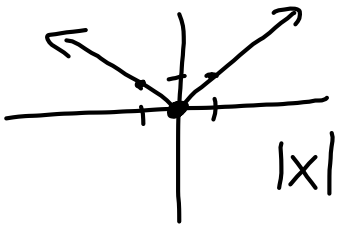


right 1
down 3

$f(x) = |x-1|-3$

7b)





$f(x) = -2|x|+4$

5c) $(3)2^x + 4$

vertical stretch of 3
shift up 4

$f(x) = 2^x$

$f(x+7) = 2^{(x+7)}$

2^{x+7}

Homework 2.2 Solutions

1.
   a. 41
   b. –19
   c. $-8n-11$

2.
   a. 23
   b. –2
   c. n^2+6n+7

3.
   a. $\frac{1}{9}$
   b. 81
   c. $\sqrt{3}$

4.
   a. –28
   b. –8
   c. –8

5.
   a. Translate left 7
   b. Reflect in the *y*-axis; Reflect in the *x*-axis
   c. Translate up 4; Vertical stretch by a factor of 3.

6.
   a. Translate left 10; Vertical shrink by a factor of ½.
   b. Reflect in the *x*-axis; Translate down 3; Vertical stretch by a factor of 2.
   c. Translate right 6; Translate up 4.

7.
   a. $f(x)=|x-1|-3$
   b. $f(x)=-2|x|+4$
   c. $f(x)=-|x+2|$
   d. $f(x)=\frac{1}{2}|x|$

8. $A(h)=(h)(h+6)=h^2+6h$

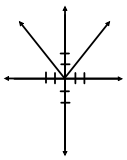
Lesson 2.3 Objectives

1. SWBAT transform functions by translations, reflections, and/or dilations

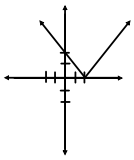
2. SWBAT identify features of functions including: relative minimum or maximum, intervals of increase or decrease, and x- or y- intercepts

Quick Review of Transformations

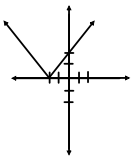
f(x) = |x|



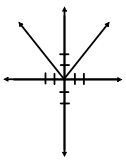
f(x) = |x-2|



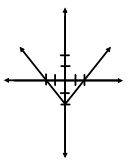
f(x) = |x+2|



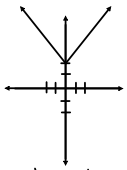
f(x) = |x|



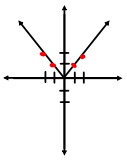
f(x) = |x|-2



f(x) = |x|+2

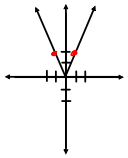


f(x) = |x|



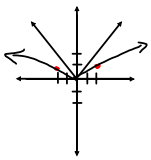
stretch

f(x) = 2|x|

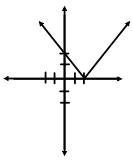


shrink

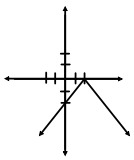
f(x) = $\frac{1}{2}$|x|



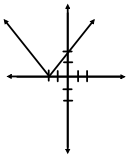
f(x) = |x-2|

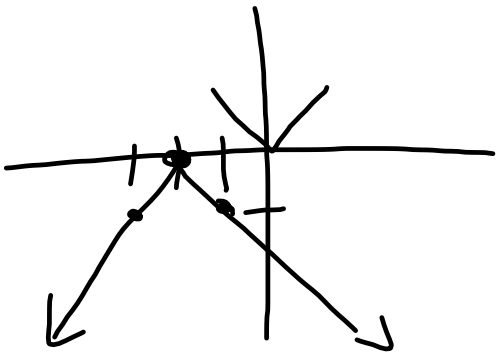


f(x) = -|x-2|



f(x) = |-x-2|



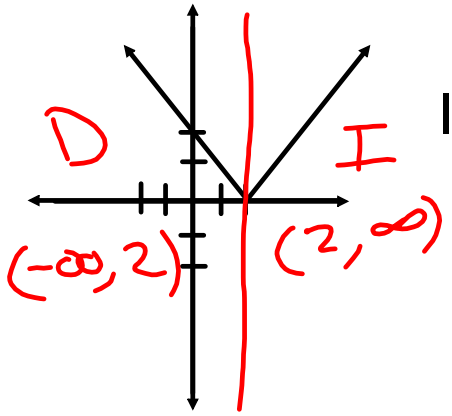


f(x)=-|x+2|

A function is INCREASING when it travels UP to the right. ↗

A function is DECREASING when it travels DOWN to the right. ↘

We describe these using interval notation



Interval of Decrease: $(-\infty, 2)$

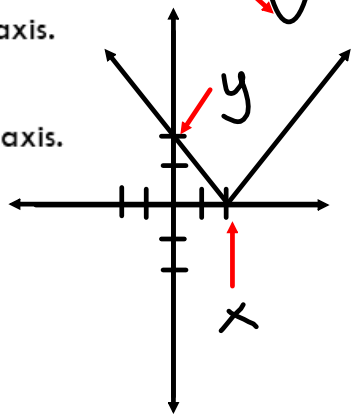
Interval of Increase: $(2, \infty)$

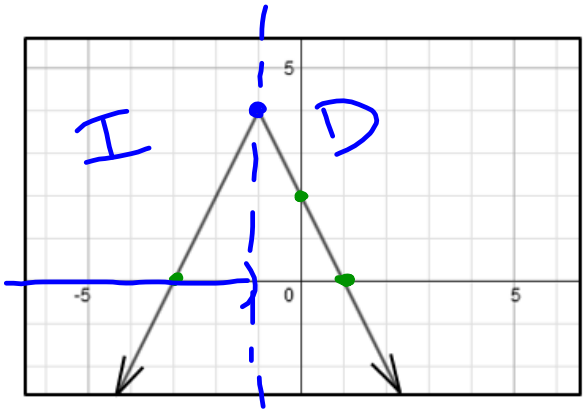
A RELATIVE MAXIMUM occurs when a function changes from INCREASING to DECREASING.

A RELATIVE MINIMUM occurs when a function changes from DECREASING to INCREASING.

An X-INTERCEPT is where the function crosses (intersects) the x-axis.

The Y-INTERCEPT is where the function crosses (intersects) the y-axis.





Increasing interval(s) $(-\infty, -1)$

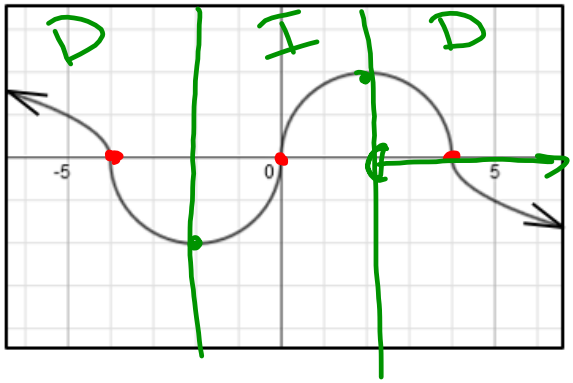
Decreasing interval(s) $(-1, \infty)$

Relative maximum(s) $(-1, 4)$

Relative minimum(s) None

x-intercept(s) $(1, 0)$ $(-3, 0)$

y-intercept $(0, 2)$



Increasing interval(s) $(-2, 2)$

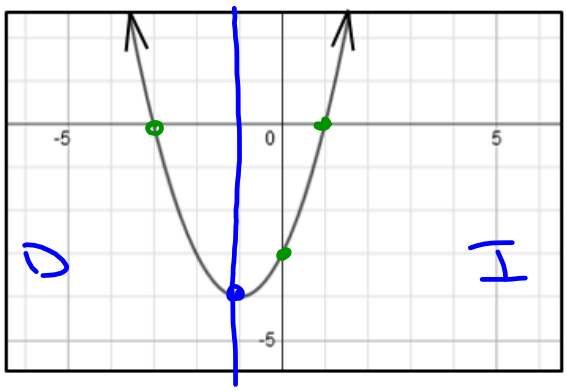
Decreasing interval(s) $(-\infty, -2)$ $\cup (2, \infty)$

Relative maximum(s) $(2, 2)$

Relative minimum(s) $(-2, -2)$

x-intercept(s) $(-4, 0)$ $(4, 0)$ $(0, 0)$

y-intercept $(0, 0)$



Increasing interval(s) $(-1, \infty)$

Decreasing interval(s) $(-\infty, -1)$

Relative maximum(s) None

Relative minimum(s) $(-1, -4)$

x-intercept(s) $(-3, 0)$ $(1, 0)$

y-intercept $(0, -3)$

4) a. $(x+2)^2 - 7$

x^2

left 2, down 7

opp

$(-2, -7)$ min

b. $-3|x-5|+10$

$(5, 10)$ max

c) $-2x^2$

$(0, 0)$ max

$-2(x+0)^2+0$