Name: _____ Per: _____ Date: _____

Serafino ▪ Algebra 2E

2C Absolute Value Functions, Equations & Inequalities

Skills Check: NO CALCULATORS

1. Rank the following absolute value functions from narrowest (1) to widest (5)

___ $y = 1/3|x|$ ___ $y = -1/2\ |x|$ ___ $y = -2|x|$ ___ $y = |x|$ ___ $y = 3/2|x|$

2. What is the domain and range of the following functions

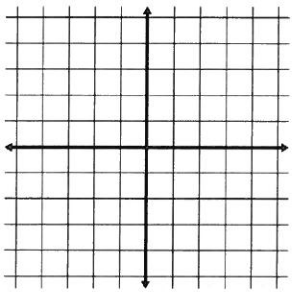
a. $f(x) = 2|x - 5|$ _____ _____

b. $f(x) = -4.7\ |x - 3| - 2$ _____ _____

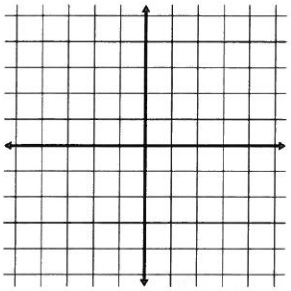
3. Write the equation for the axis of symmetry for $f(x) = -|x - 5| - 6$ _____

4. Graph the following absolute value functions:

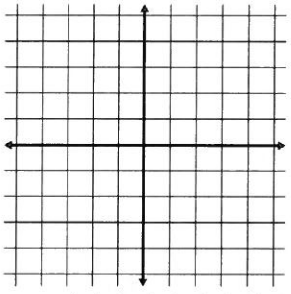
a. $f(x) = |x| + 2$



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



c. $f(x) = 4/3|x - 1| - 5$

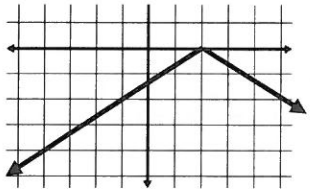


5. In function notation, write the absolute value function of the following:

a. Vertex: (–2, 5)
Point: (–7, –1)

_____

b.



_____

6. Tell if the ordered pair is a solution to the inequality (write yes or no)

$y > -2|x| + 10$ a) (0, 11) _____ b) (–2, 14) _____

7. Analyze the function $f(x) = 3|x - 2| - 2$

a) $f(2) =$ b) $f(15) =$ c) $f(-8) =$

d) Where is $f(x) = 25$?

e) Where is $f(x) = -5$?

f) What is the y–intercept?

g) What is/are the x–intercept(s)?

h) Solve: $f(x) > 4$

i) If $g(x) = -4f(x + 3) - 1$, what is $g(x)$?

8. Smarty–pants Stella looks at $|x + 5| \leq -4$ and knows the answer without doing any work. Without doing any work, what is the answer and how do you know? Explain.

9. If $g(x) = 2|x + 1| - 6$ was transformed to $k(x) = -\frac{1}{2}\, g(x - 6) + 5$
Name all physical transformations performed to $g(x)$

10. Consider the function, $f(x) = -2|x + 3| + 27$. What is the average rate of change between $f(-10)$ and $f(2)$?

11. Use your calculator to find the point(s) of intersection of $h(x) = f(x) = 3|x - 2| - 2$ $p(x) = -1/3\, x + 12$.

Name: KEY Per: 1 Date: 10/27/15

Serafino • Algebra 2E

2C Absolute Value Functions, Equations & Inequalities

~~Skills Check: NO CALCULATORS~~ Review HW

1. Rank the following absolute value functions from narrowest (1) to widest (5)

(5) $y = 1/3|x|$ (4) $y = -1/2\,|x|$ (1) $y = -2|x|$ (3) $y = |x|$ (2) $y = 3/2|x|$

0.3 0.5 2 1 1.5

2. What is the domain and range of the following functions

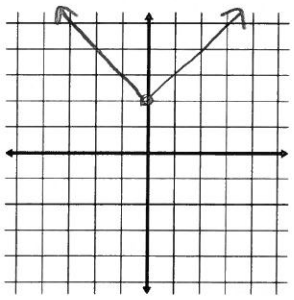
a. $f(x) = 2|x-5|$ $x \in \mathbb{R}$; $y \geq 0$

b. $f(x) = -4.7\,|x-3| - 2$ $x \in \mathbb{R}$; $y \leq -2$

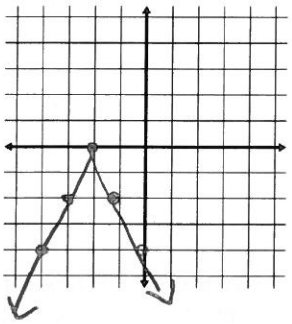
3. Write the equation for the axis of symmetry for $f(x) = -|x-5| - 6$ $x = 5$

4. Graph the following absolute value functions:

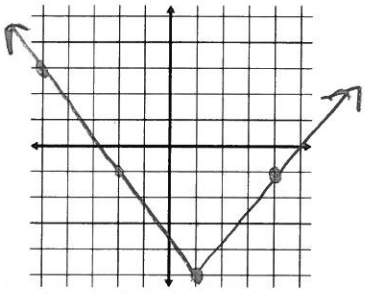
a. $f(x) = |x| + 2$



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



c. $f(x) = 4/3|x-1|-5$



5. In function notation, write the absolute value function of the following:

a. Vertex: (–2, 5)
Point: (–7, –1)

$y = a|x+2|+5$

$-1 = a|-7+2|+5$

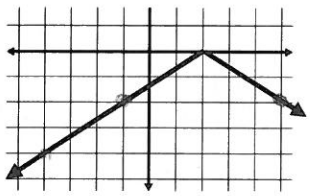
$-5 \quad\quad -5$

$-6 = a(5)$

$\frac{-6}{5} = \frac{a(5)}{5}$

$y = -\frac{6}{5}|x+2|+5$

b.



$y = -\frac{2}{3}|x-2|$

6. Tell if the ordered pair is a solution to the inequality (write yes or no)

$y > -2|x| + 10$

a) (0, 11) YES

$11 \stackrel{?}{>} -2|0|+10$

$11 \stackrel{?}{>} 0+10$

$11 > 10$

b) (–2, 14) YES

$14 \stackrel{?}{>} -2|-2|+10$

$14 \stackrel{?}{>} -2(2)+10$

$14 \stackrel{?}{>} -4+10$

$14 > 6$

7. Analyze the function $f(x) = 3|x - 2| - 2$

a) $f(2) = 3|2-2|-2$
$3(0)-2$
$= \boxed{-2}$

b) $f(15) = 3|15-2|-2$
$3(13)-2$
$= \boxed{37}$

c) $f(-8) = 3|-8-2|-2$
$3(10)-2$
$= \boxed{28}$

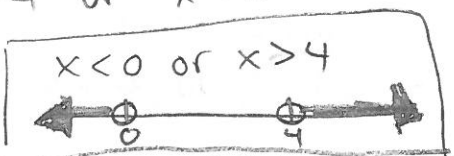
d) Where is $f(x) = 25$? $3|x-2|-2 = 25$
$+2 \quad +2$
$3|x-2| = 27$
$|x-2| = 9$
$x-2=9 \quad x-2=-9$
$x = 11 \quad x = -7$
$\boxed{x = -7, 11}$

e) Where is $f(x) = -5$?
NO where!

f) What is the y–intercept?
$x = 0$
$y = 3|0-2|-2 = 3(2)-2 = 6-2 = 4$
$\boxed{(0, 4)}$

g) What is/are the x–intercepts(s)? $3|x-2|-2 = 0$
$y = 0$
$\frac{3}{3}|x-2| = \frac{2}{3}$
$x-2 = \frac{2}{3}+\frac{6}{3} \quad x-2 = -\frac{2}{3}+\frac{6}{3}$
$+2$
$\boxed{\left(\frac{8}{3}, 0\right), \left(\frac{4}{3}, 0\right)}$

h) Solve: $f(x) > 4$ $3|x-2|-2 > 4$
$+2 \quad +2$
$\frac{3}{3}|x-2| > \frac{6}{3}$
$|x-2| > 2$
$x-2 > 2$ or $x-2 < -2$
$x > 4$ or $x < 0$



i) If $g(x) = -4f(x+3) - 1$, what is $g(x)$?
$g(x) = -4f(x+3)-1$
$-4f(x) = -12|x-2|+8$
$+3 \quad -1$
$\boxed{g(x) = -12|x+1|+7}$

8. Smarty–pants Stella looks at $|x + 5| \leq -4$ and knows the answer without doing any work. Without doing any work, what is the answer and how do you know? Explain.

The absolute value of any expression can't be negative, so no solution!

9. If $g(x) = 2|x + 1| - 6$ was transformed to $k(x) = -\frac{1}{2}\, g(x - 6) + 5$
Name all physical transformations performed to g(x)

- Reflected over x-axis
- vertically compressed by a factor of $\frac{1}{2}$
- shifted 6 right and 5 units up

10. Consider the function, $f(x) = -2|x + 3| + 27$. What is the average rate of change between f(–10) and f(2)?

$f(-10) = -2|-10+3|+27$
$= -2(7)+27$
$= -14+27$
$= 13$

$f(2) = -2|2+3|+27$
$-2(5)+27$
$= 17$

$m = \frac{4}{12} = \boxed{\frac{1}{3}}$

11. Use your calculator to find the point(s) of intersection of $h(x) = f(x) = 3|x - 2|-2$ $p(x) = -1/3\, x + 12$.

$\boxed{(-3, 13), (6, 10)}$