Name Solution **Period** _____

2.6 – 2.8 TEST REVIEW

2.7 Transformations

Identify the parent function. Then use the indicated transformations to create a transformation table and graph the function.

1. $f(x) = -2(x-1)^2 + 4$ pf: $y = x^2$

pf:

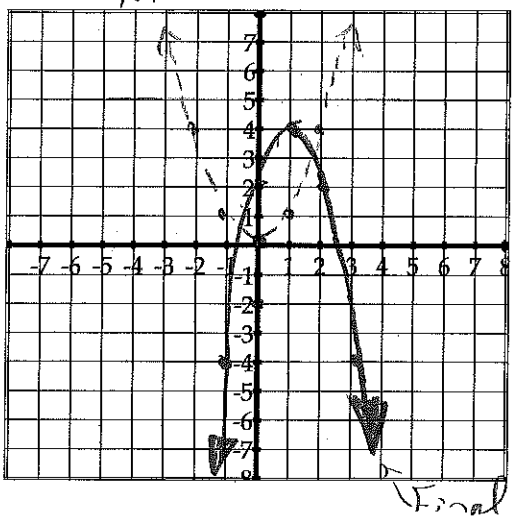
x	y
-2	4
-1	1
0	0
1	1
2	4

Transformations

x+1	-2y+4
-1	-4
0	2
1	4
2	2
3	-4

R 1, U 4, vert flip, vert st $\Rightarrow$ SF = 2

pf.



2. $f(x) = |x+2| - 2$ pf: $y = |x|$

pf

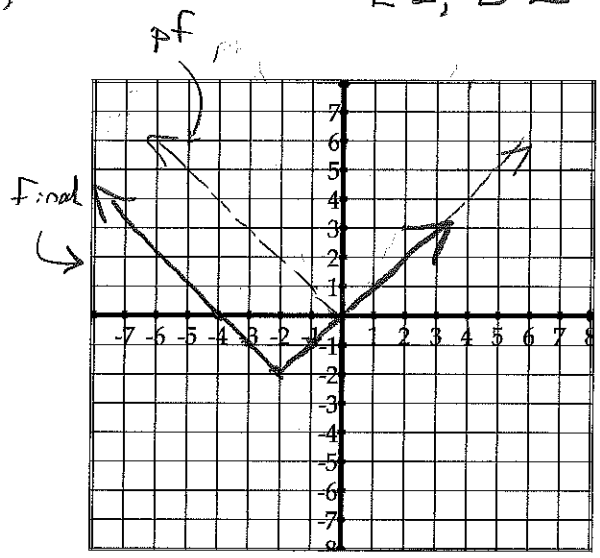
x	y
-2	2
-1	1
0	0
1	1
2	2

transformations

x-2	y-2
-4	0
-3	-1
-2	-2
-1	-1
0	0

L 2, D 2

pf



Identifying transformations.

3. $g(x) = \frac{1}{3}(x-4)^2 + 2$

parent function: $y = x^2$

transformation: 4 R, 2 U

Vert. comp. SF = $\frac{1}{3}$

4. $f(x) = -\frac{1}{3}|x+1| - 5$

parent function: $y = |x|$

transformation: 1 L, 5 D

vert comp SF = $\frac{1}{3}$, vert flip (over x-axis)

5. Let g(x) be a horizontal translation 3 units left, followed by a vertical translations 2 units down of the parent function $f(x) = x^2$. Write the rule for g(x).

$$g(x) = (x+3)^2 - 2$$

6. Let g(x) be a horizontal translation 2 units right followed by a vertical reflection and a vertical stretch by a factor of 4 of the function $f(x)=|x|$. Write the rule for g(x).

$g(x)=-4|x-2|$

7. Let g(x) be a translation 4 units left and 3 units down of $f(x)=x^2-4$. Write the rule for g(x).

$g(x)=(x+4)^2-4-3 \Rightarrow g(x)=(x+4)^2-7$

8. Let $g(x)$ be a horizontal translation left 3 units, followed by a vertical compression of $\frac{1}{2}$ and then a reflection over the x-axis of $f(x)=|x|$. Write the rule for $g(x)$.

$g(x)=-\frac{1}{2}|x+3|$

2.6 Piecewise functions

Evaluate the piecewise functions for each given value.

9.

$$f(x)=\begin{cases}-3, & \text{if } x\le -1\\ 2, & \text{if } -1<x<8\\ 7, & \text{if } x\ge 8\end{cases}$$

a. $f(8)=7$

b. $f(-1)=-3$

10.

$$f(x)=\begin{cases}-x+12, & \text{if } x<-8\\ x^2+2, & \text{if } -8\le x\le 7\\ 3x-7, & \text{if } x>7\end{cases}$$

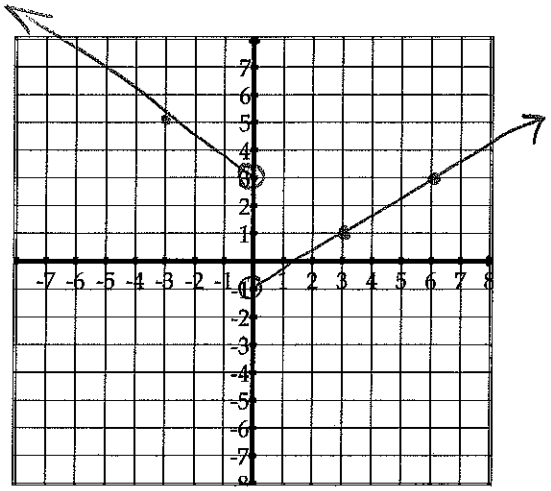
a. $f(-12)=-(-12)+12=24$

b. $f(-3)=(-3)^2+2=11$

Graph the following piecewise functions.

11. $f(x) = -\frac{2}{3}x + 3$, **if** $x < 0$

$\frac{2}{3}x - 1$, **if** $x > 0$



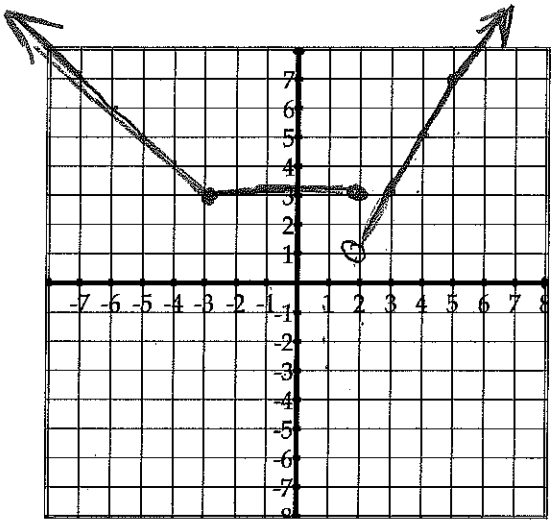
D: $(-\infty, 0) \cup (0, \infty)$

R: $(-1, \infty)$

12. $f(x) = -x$ **if** $x < -3$

3 **if** $-3 \leq x \leq 2$

$2x - 3$, **if** $x > 2$

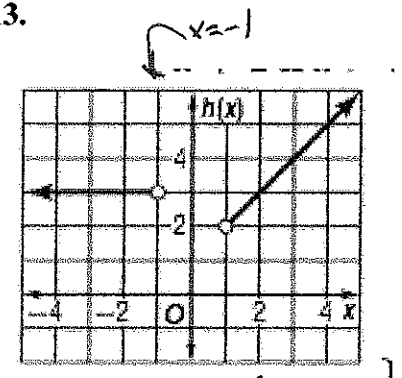


D: $(-\infty, \infty)$ or $\mathbb{R}$

R: $(1, \infty)$

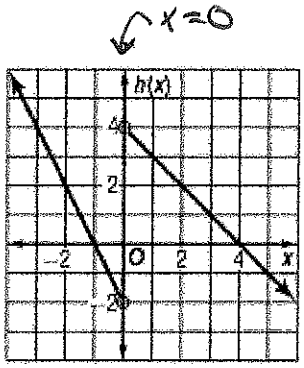
Write a piecewise function for each graph.

13.



$f(x) = \begin{cases} 3, & x < -1 \\ x + 1, & x > 1 \end{cases}$

14.



$f(x) = \begin{cases} -x + 4, & x > 0 \\ -2x - 2, & x < 0 \end{cases}$

15. A house painter charges $12 per hour for the first 40 hours he works, time and a half for the 10 hours after that, and double time for all hours after that. Write and graph a piecewise function that describes the painter's income in terms of the number of hours he has worked. You may assume that his work week never surpasses 70 hours.

$$h(x) = \begin{cases} 12h, & h \le 40 \\ 18h - 240, & h > 40 \end{cases}$$

$h = 70 \Rightarrow 18 \cdot 70 - 240 = 1020$

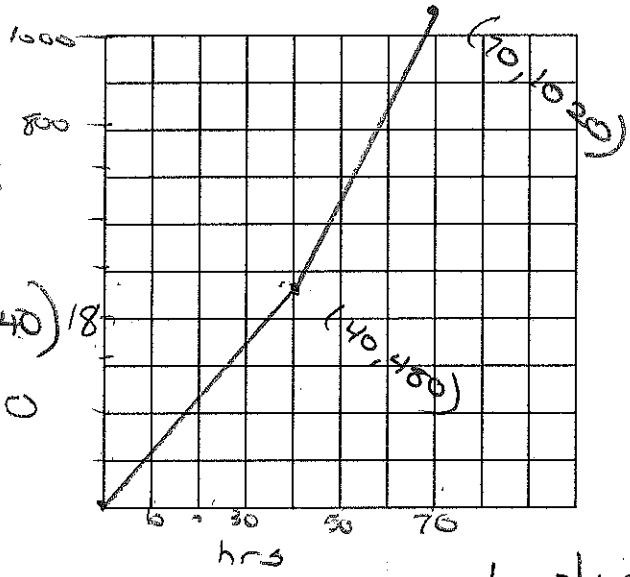
(70, 1020)

(40, 480)

$12(40) + (h-40)18$

$480 + 18h - 720$

$18h - 240$



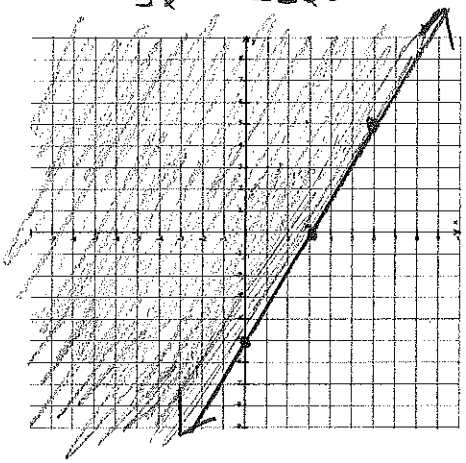
2.8 Graphing linear & absolute value inequalities.

15. $5x - 3y \le 15$

$-5x \quad -5x$

$\frac{-3y}{-3} \le \frac{-5x}{-3} + \frac{15}{-3}$

$y \ge \frac{5}{3}x - 5$



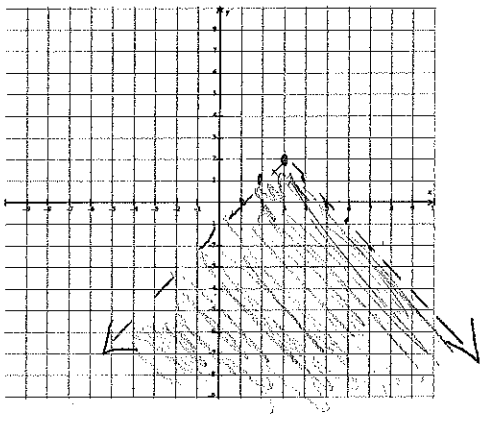
16. $y - 2 < -|x-3|$

$+2 \quad +2$

$y < -|x+3| + 2$

vertex

(3, 2)



x	y
1	0
2	1
3	2
4	1
5	0