HW 7.2

April 1, 2015 8:12 PM

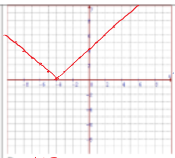
Name: Key Date:

Pre Calculus 11: HW Section 7.2 Graphing Absolute Value Equations:

1. Given each equation, make a TOV, graph it on the grid provided, and write the domain and range:

a) $y=|x+4|$

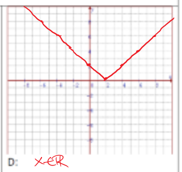
0	4
-1	3
-2	2
-3	1
-4	0



D: $x \in \mathbb{R}$
R: $y \geq 0$

b) $y=|x-2|$

0	2
2	0
4	2
6	4
8	6



D: $x \in \mathbb{R}$
R: $y \geq 0$

a) $y=|2x-3|$

0	3
1	1
2	1
3	3
4	5

D: $x \in \mathbb{R}$
R: $y \geq 0$

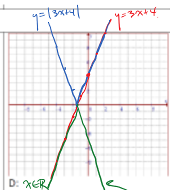
THE BLUE GRAPH IS $y=|2x-3|$

THE RED GRAPH IS $y=2x-3$

THE COORDINATES CAN BE ANY POINT YOU CHOOSE. JUST PICK ANY x-VALUE CLOSE TO THE x-INTERCEPT.

b) $y=-|3x+4|$

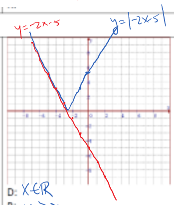
-4	-8
-3	-5
-2	-2
-1	-1
0	-4



D: $x \in \mathbb{R}$
R: $y \leq 0$

a) $y=|-2x-5|$

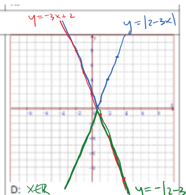
0	-5
-1	3
-2	1
-3	1
-4	3



D: $x \in \mathbb{R}$
R: $y \geq 0$

b) $y=-|2-3x|$

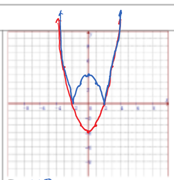
0	-2
1	-1
2	-4
3	-7
4	-10



D: $x \in \mathbb{R}$
R: $y \leq 0$

a) $y=|x^2-4|$

-2	0
-1	3
0	4
1	3
2	0



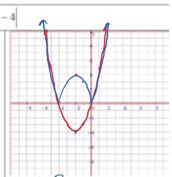
D: $x \in \mathbb{R}$
R: $y \geq 0$

PIECE WISE FUNCTION:

$$y=\begin{cases} x^2-4 & ;\ x<2\ (L) \\ -(x^2-4) & ;\ 2\leq x<2\ (M) \\ x^2-4 & ;\ 2\leq x\ (R) \end{cases}$$

b) $y=|(x+2)^2-4|$

-4	0
-3	3
-2	4
-1	3
0	0



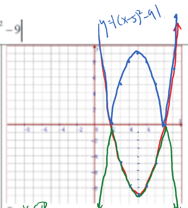
D: $x \in \mathbb{R}$
R: $y \geq 0$

PIECE WISE FUNCTION:

$$y=\begin{cases} (x+2)^2-4 & x<-4\ (L) \\ -[(x+2)^2-4] & -4\leq x<0\ (M) \\ (x+2)^2-4 & 0\leq x\ (R) \end{cases}$$

a) $y=-|(x-5)^2-9|$

2	0
3	-5
4	-8
5	-9
6	-8

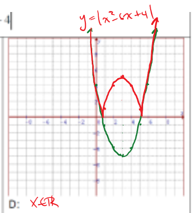


D: $x \in \mathbb{R}$
R: $y \leq 0$

$$y=\begin{cases} -[(x-5)^2-9] & x<2 \\ (x-5)^2-9 & 2\leq x<8 \\ -[(x-5)^2-9] & 8\leq x \end{cases}$$

b) $y=|x^2-6x+4|$

0	4
1	1
2	4
3	5
4	4



D: $x \in \mathbb{R}$
R: $y \geq 0$

$y=x^2-6x+4$
$y=x^2-6x+4+5-5$
$y=(x^2-6x+9)-5$
$y=(x-3)^2-5$

TO WRITE THE P.W. FUNCTION, YOU NEED THE x-intercepts!

$0=(x-3)^2-5$
$5=(x-3)^2$
$\pm\sqrt{5}=x-3$
$3\pm\sqrt{5}=x$
$(3-\sqrt{5},0)\ (3+\sqrt{5},0)$.

$$y=\begin{cases} (x-3)^2-5 & x<3-\sqrt{5} \\ -[(x-3)^2-5] & 3-\sqrt{5}\leq x<3+\sqrt{5} \\ (x-3)^2-5 & 3+\sqrt{5}\leq x \end{cases}$$

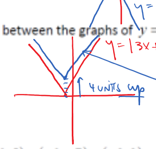
2. What is the difference between the graphs of $y=|3x+1|$ and $y=-|3x+1|$.

A VERTICAL REFLECTION.

THE NEGATIVE IN FRONT WILL FLIP THE GRAPH UP SIDE DOWN OVER THE x-AXIS.

3. What is the difference between the graphs of $y=|3x+1|$ and $y=|3x+1|+4$.

4 UNITS UP



MOVED GRAPH 4 UNITS UP

4. The following points $(3,5)$, $(-3,-7)$, $(-2,8)$, $(7,-10)$, and $(-3,-9)$ are on the function $y=f(x)$.

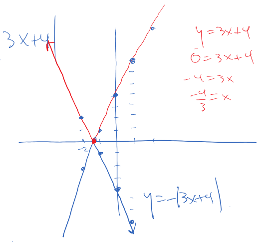
What will the coordinates be on the function: $y=|f(x)|$?

$y=f(x) \longrightarrow y=|f(x)|$ WHEN TAKING THE ABS. VALUE

1b) $y=-|3x+4|$

x	y
0	-4
1	-7
-1	-1
2	-10
-2	-2

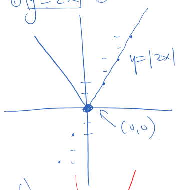
$y=3x+4$
$0=3x+4$
$-4=3x$
$-\frac{4}{3}=x$



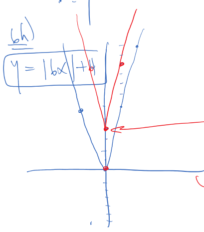
6a) $y=|2x|$

$0=|2x|$
$0=2x$
$0=x$

① $\boxed{y=2x}$ ①



6h) $\boxed{y=|6x|+4}$



$y=|6x|-3$

#1) 2nd page.

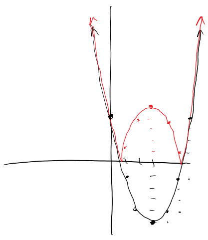
1d) $y=|x^2-6x+4|$

$y=|(x^2-6x)+4|$

$y=|(x^2-6x+9-9)+4|$

$y=|(x^2-6x+9)-5|$

$y=|(x-3)^2-5|$



#4)

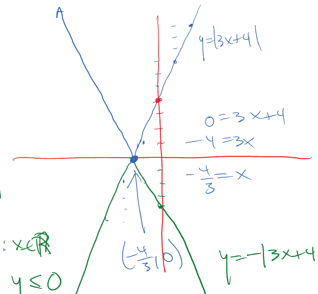
$y=f(x)$	$\to$	$y=\lvert f(x)\rvert$
(3,5)	$\to$	(3,5)
(-3,-7)	$\to$	(-3,7)
(-2,8)	$\to$	(-2,8)
(7,-10)	$\to$	(7,10)
(-3,-9)	$\to$	(-3,9)

#1b) (2nd)

$y=-|3x+4|$

① $y=|3x+4|$

$y=-|3x+4|$



Domain: $x \in \mathbb{R}$
Range: $y \leq 0$

#4)

$y=f(x)$	$\to$	$y=\lvert f(x)\rvert$
(3,5)	$\to$	(3,5)
(-3,-7)	$\to$	(-3,7)
(-2,8)	$\to$	(-2,8)
(7,-10)	$\to$	(7,10)
(-3,-9)	$\to$	(-3,9)

#1a) (last)

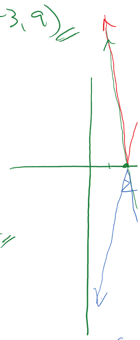
$y=-|(x-5)^2-9|$

① $y=(x-5)^2-9$
vertex $(5,-9)$
$a=1 \Rightarrow 1,3,5,7$

② $y=|(x-5)^2-9|$

③ $y=-|(x-5)^2-9|$

$y=-[(x-5)^2-9]$



y = { −((... , +((... , −((...

#1b (2nd page)

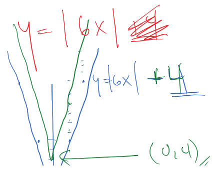
$y=|x^2-6x+4|$

$y=|(x^2-6x)+4|$

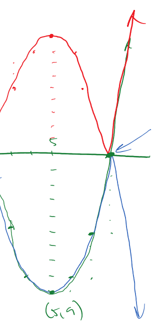
$y=|(x^2-6x+9-9)+4|$

$y=|(x-3)^2-5|$

6h) $y=|6x|$ ~~...~~



$+4$



$x-5)^2-9)$ $\quad x < 2$

$(-5)^2-9)$ $\quad 2 \leq x < 8$

$x-5)^2-9)$ $\quad 8 \leq x$

4. The following points $(3,5)$, $(-3,-7)$, $(-2,8)$, $(7,-10)$, and $(-3,-9)$ are on the function $y=f(x)$.

What will the coordinates be on the function: $y=|f(x)|$?

$y=f(x) \longrightarrow y=|f(x)|$

x	y
3	5
-3	-7
-2	8
7	-10
-3	-9

$\rightarrow$

x	y
3	5
-3	7
-2	8
7	10
-3	9

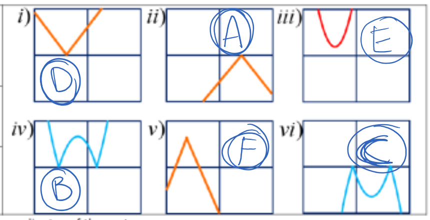
WHEN TAKING THE ABS. VALUE OF A FUNCTION, THE x-COORD. DON'T CHANGE, ONLY THE y-COORD CHANGES.

$+ \rightarrow +$ ive

$- \rightarrow +$ ive

5. Given each equation on the right, indicate which of the graphs on the right is the corresponding one:

a) $y=-\lvert -3x+7\rvert$	b) $y=\lvert (x+3)^2-4\rvert$
c) $y=-\lvert (x-3)^2-5\rvert$	d) $y=\lvert 3x+7\rvert$
e) $y=\lvert (x+3)^2+1\rvert$	f) $y=-\lvert -5x-8\rvert+4$



6. Given each equation, indicate the coordinates of the vertex:

a) $y=|2x|$

SINCE THERE ARE NO VERTICAL SHIFTS, THE VERTEX IS ON THE x-AXIS.

$0=2x$

$0=x$

vertex $(0,0)$

b) $y=|2x-3|$

$0=2x-3$

$\frac{3}{2}=x$

vertex $\left(\frac{3}{2},0\right)$

c) $y=|2x+5|$

$2x+5=0$

$2x=-5$

$x=-\frac{5}{2}$

vertex $\left(-\frac{5}{2},0\right)$

d) $y=|-3x|$

$0=-3x$

$0=x$

vertex $(0,0)$

e) $y=|-3x+7|$

$0=-3x+7$

$3x=7$

$x=\frac{7}{3}$ vertex $\left(\frac{7}{3},0\right)$

f) $y=|-3x-8|$

$-3x-8=0$

$-3x=8$

$x=-\frac{8}{3}$ vertex $\left(-\frac{8}{3},0\right)$

g) $y=|6x|$

$0=6x$

$0=x$

vertex $(0,0)$

h) $y=|6x|+4$

i) $y=|6x|-3$

THESE TWO FUNCTIONS HAVE VERTICAL SHIFTS B/C OF THE $+4$ OR -3 OUTSIDE OF THE ABS. VALUE.

$0=6x$

$0=0$

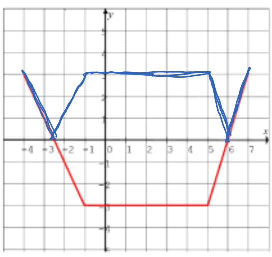
vertex is $(0,0)$ THEN SHIFTS 4 up.

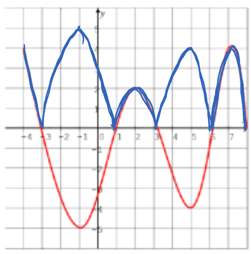
vertex is $(0,4)$

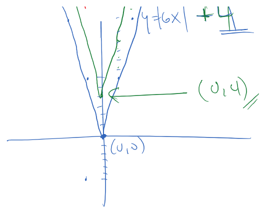
vertex is $(0,0)$ THEN SHIFT 3 DOWN.

vertex $(0,-3)$

7. Given the graphs of $y=f(x)$, draw the graph of $y=|f(x)|$







#4) $y=f(x) \longrightarrow y=|f(x)|$

x	y
3	5
-3	-7
-2	8
7	-10
-3	-9

x	y
3	5
-3	7
-2	8
7	10
-3	9

#1a) $y=|(x-5)^2-9|$

$y=a(x-p)^2+q$

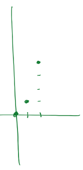
$p=5$, $q=-9$ vertex $(5,-9)$

$\boxed{a=1,\ 1,3,5,7,9,11}$

$y=2x^2$

x	y
0	0
1	1
2	4
3	9
4	16

1, 3, 5, 7



① CTS

6b) (last b)

$y=|x^2-6x+4|$

$y=|x^2-6x+4$

$y=|(x^2-6x+9$

$y=|(x-3)^2$

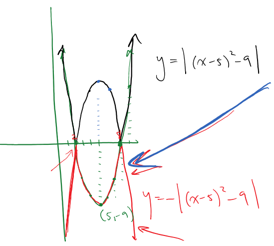
②

$(x-3)^2-5=($

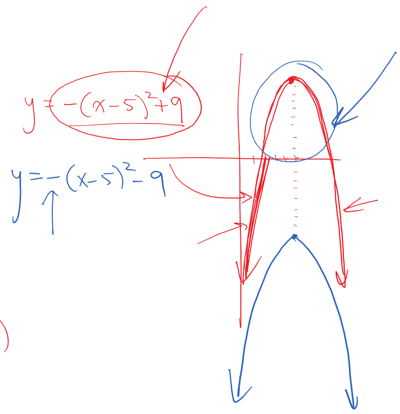
$(x-3)^2=$

$x-3=$

$\boxed{x=3\pm}$



$$y=\begin{cases} -(x-5)^2+9 & x<2 \quad (L) \\ -(-(x-5)^2+9) & 2\leq x<8 \quad (M) \\ -(x-5)^2+9 & 8\leq x \end{cases}$$



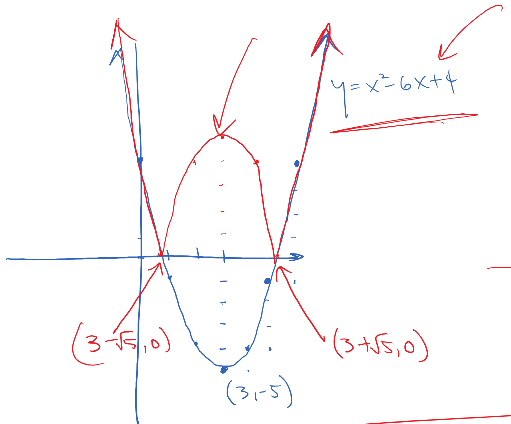
$+5-5|$

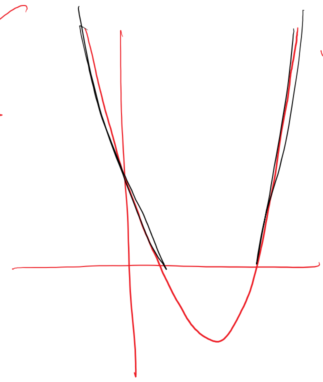
$)-5|$

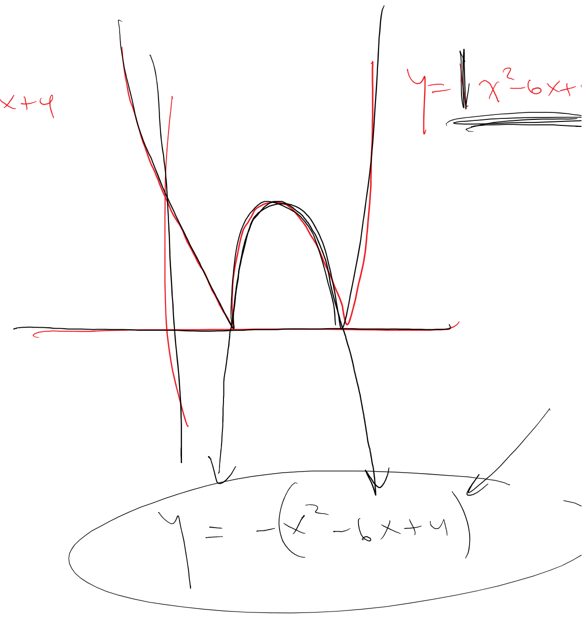
$-5|$

$\pm\sqrt{5}$

$\sqrt{5}$







③ $$y=\begin{cases} x^2-6x+4; & x<(3-\sqrt{5}) \quad (L) \\ -(x^2-6x+4) & (3-\sqrt{5}\leq x<3+\sqrt{5}) \quad (M) \\ x^2-6x+4 & x\geq(3+\sqrt{5}) \quad R \end{cases}$$

#1) 1b)

① C.T.S. $y = |x^2 - 6x + 4|$

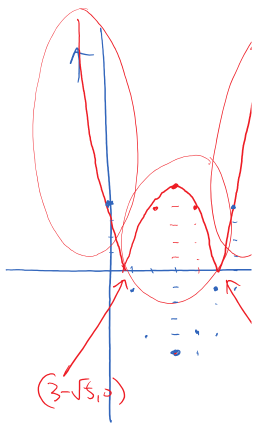
$y = |x^2 - 6x + 4 + 5 - 5|$

$y = |(x^2 - 6x + 9) - 5|$

$\boxed{y = |(x-3)^2 - 5|}$

vertex $(3, -5)$

$a = 1$ 1, 3, 5, 7



②

$0 = (x-3)^2 - 5$

$\sqrt{5} = \sqrt{(x-3)^2}$

$\pm\sqrt{5} = (x-3)$

$3 \pm \sqrt{5} = x$

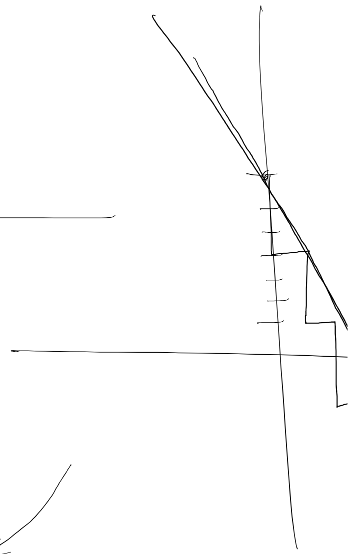
$y = \begin{cases} x^2 - 6x + 4 & (x \\ -(x^2 - 6x + 4) & 3 - \sqrt{5} \leq \\ x^2 - 6x + 4 & x \end{cases}$

6e) $y = |-3x+7|$

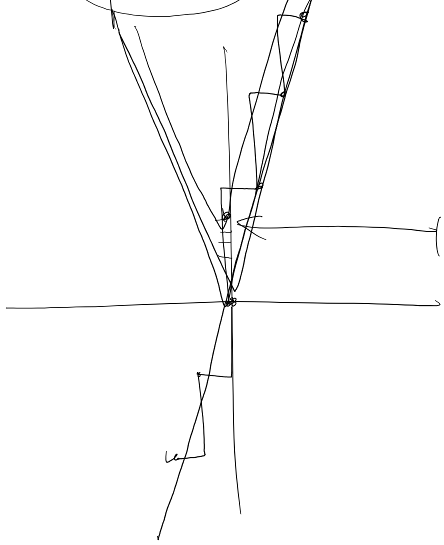
$0 = -3x+7$

$3x = 7$

$\boxed{x = \frac{7}{3}}$



6h) $y = |6x| + 4$



$(0,4)$

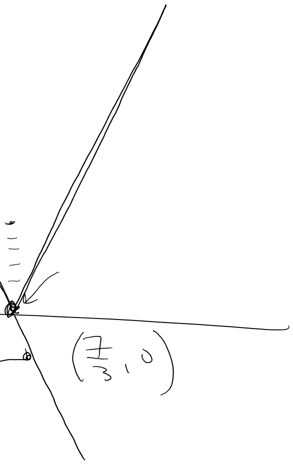
$y = |x^2 - 6x + 4|$

$(3+\sqrt{5}, 0)$

$< 3-\sqrt{5})$ L

$\leq x < 3-\sqrt{5}$ M

$\geq 3+\sqrt{5}$ R


(7/3, 0)

$3 \pm \sqrt{5} = x$

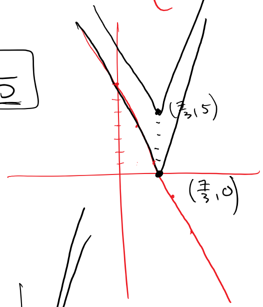
$x^2 - 6x + 4 \quad x$

#6 e) $\boxed{y = |-3x+7| + 5}$

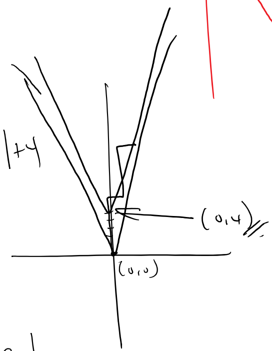
$0 = -3x + 7$

$3x = 7$

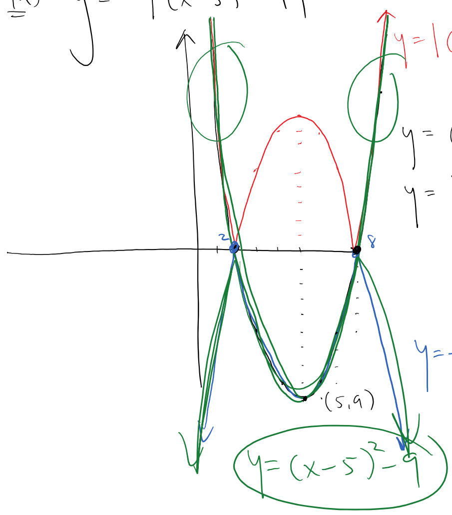
$\boxed{x = \frac{7}{3}}$



6h) $y = |6x| + 4$



1a) $y = -|(x-5)^2 - 9|$



$y = |(x-5)^2 - 9|$

$y = (x-5)^2 - 9$

$y = |(x-5)^2 - 9|$

$y = -|(x-5)^2 - 9|$

$y = \begin{cases} -((x- \\ (x \\ -((x \end{cases}$

$\geq 3+\sqrt{5}$ R

$-5)^2-9]$, $x<2$ L

$-5)^2-9$ $\leq x<8$ M

$-5)^2-9]$ $x\geq 8$ R