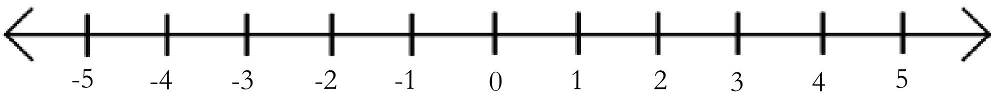
OUTCOME:

AN1 - Demonstrate an understanding of absolute value of real numbers

Absolute value: $|x|$

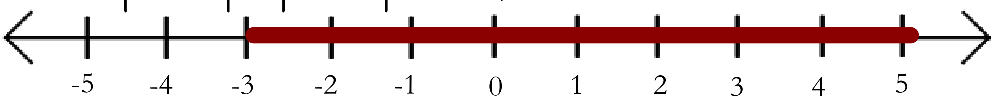


-5 and 5 are both 5 units from 0

$\therefore |-5| =$ and $|5| =$

The distance between two points on a number line, a and b can be found by taking the absolute value of the difference between a and b, where

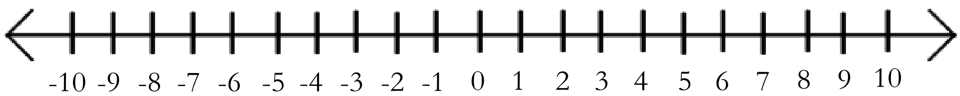
$|a-b| = |b-a|$ and, $a, b \in R$



** Absolute value signs are considered as brackets for order of operations. **

1. Evaluate: a. $|-7|$ b. $|9|$ c. $|-2-8|$ d. $|5--6|$

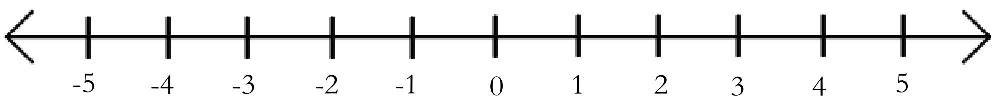
2. Draw the above absolute values on a number line



3. What does $|-7|$ represent?

4. What is the magnitude of -10?

5. Place the following numbers on a number line A (0.7) B (-1.4) C $(-\frac{3}{5})$ D $(-2\frac{1}{4})$ E (2)



i) determine the absolute value of each number

ii) determine the distance between B and E, and between C and D

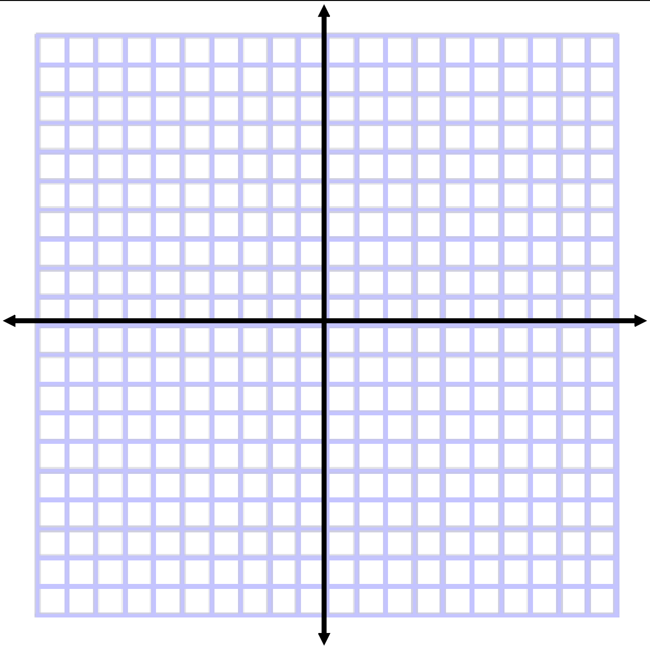
6. Determine the value of: $7|0.4-5| + |(-2)^3|$

. Practice: Page 363 #1,3,4,5, 6ACE

Outcome: RF2 - Graph and analyze absolute value functions (linear and quadratic) to solve problems.

$y = x$

x	y
-2	
-1	
0	
1	
2	



$y = |x|$

x	y
-2	
-1	
0	
1	
2	

$y = |x|$ is defined as a piecewise function (composed of two or more separate functions)

For all values of $f(x)$ less than 0, the y-values of $|f(x)|$ is $-f(x)$;

and for all values of $f(x)$ greater than 0 or equal to 0, the y-value of $|f(x)|$ is $f(x)$

The following table of values is given for $y = f(x)$

Fill in the corresponding values for $y = |f(x)|$

x	$f(x)$	$\|f(x)\|$
-3	32	
-2	12	
-1	-2	
0	-10	
1	-12	
2	8	
3	2	

Function notation reminder:

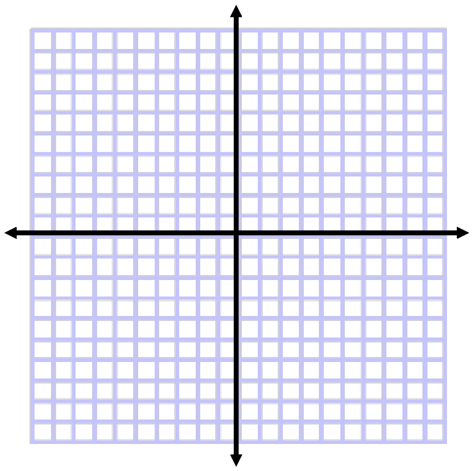
y=2x-3

f(x) = 2x - 3

f(5) = 2(5)-3

For the function f(x) = 2x - 1
Make a table of values for f(x) and | f(x) |

x	f(x)	| f(x) |



Write the piecewise function for f(x).

You need to find the x-intercept...

Write $y = |-3x + 7|$ as a piecewise function

Write the following as piecewise functions.

a) $y = |2x + 4|$ b) $y = |4x - 3|$ c) $y = |-2x + 5|$

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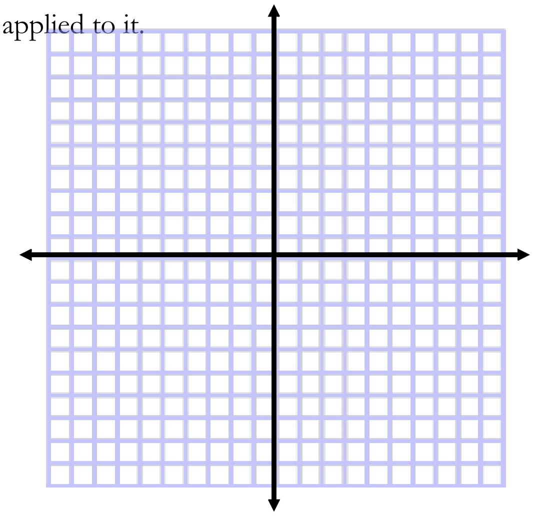
When graphing, graph the line of $y = f(x)$

The x-intercept of this line is the same as the x-intercept of the absolute value function because the value of zero
is still zero. This is called an invariant point.

(A point that remains unchanged when a transformation is applied to it.

Draw the graph of $y = |-4x + 8|$



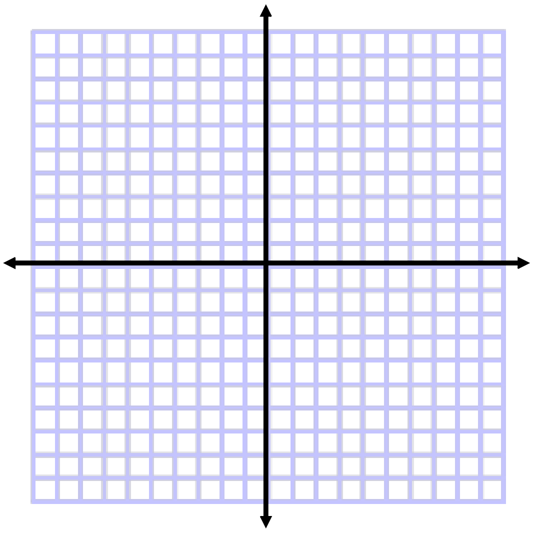
x-intercept:

y-intercept:

domain: range:

piecewise function:

You try: $y = |2x - 4|$



Determine the x-intercept and y-intercepts:

Sketch the graph:
State the domain and range:

Express as a piecewise function:

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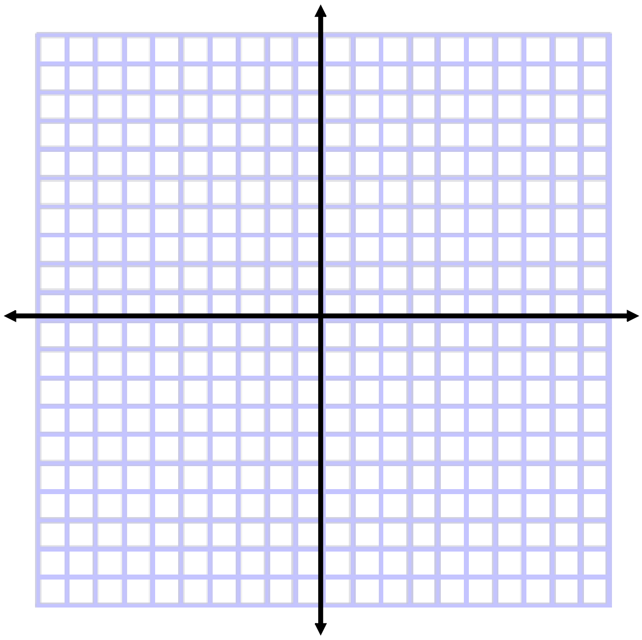
$$y = |3x + 1|$$

Determine the x-intercept and y-intercepts:



Sketch the graph:

State the domain and range:

Express as a piecewise function:

Practice: p375 # 1, 2, 5, 6ace, 9,11ab

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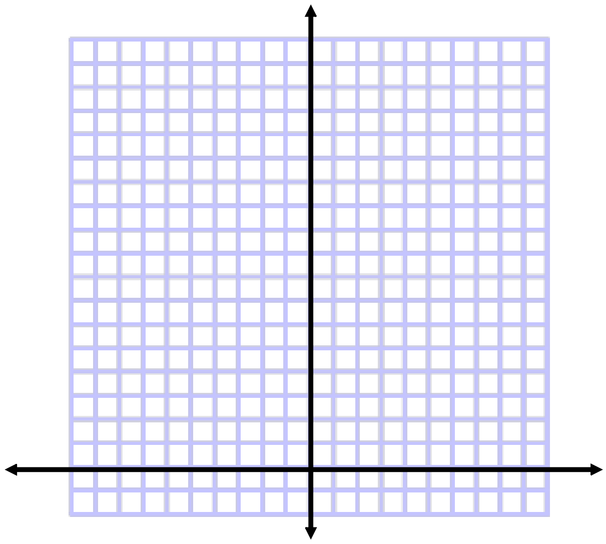
Absolute value and quadratic functions:

Graph: $y = \left|x^2 + 4x - 12\right|$



Find x-int's (y=0)...factor

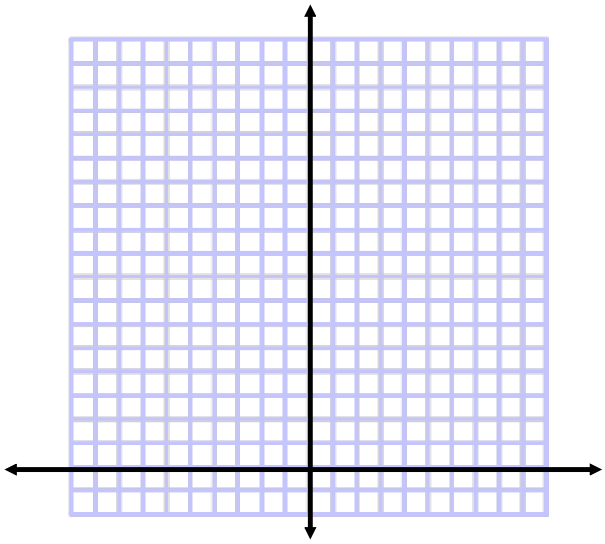
Find y-int (x=0)

Find vertex (complete the square...or...average x-int's)

Absolute value and quadratic functions:

Graph:

$$y = \left|x^2 + 8x + 15\right|$$



Find x-int's (y=0)...factor

Find y-int (x=0)

Page 376-7 #7, 8abe, 10

Find vertex (complete the square...or...average x-int's

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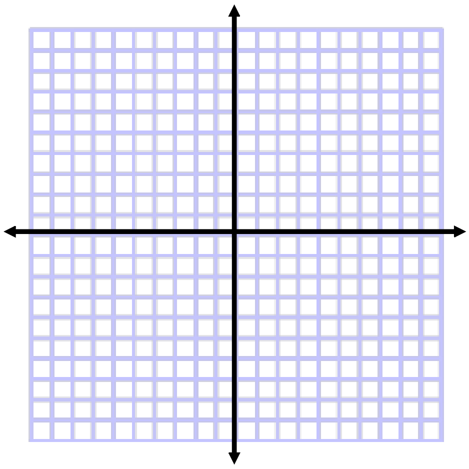
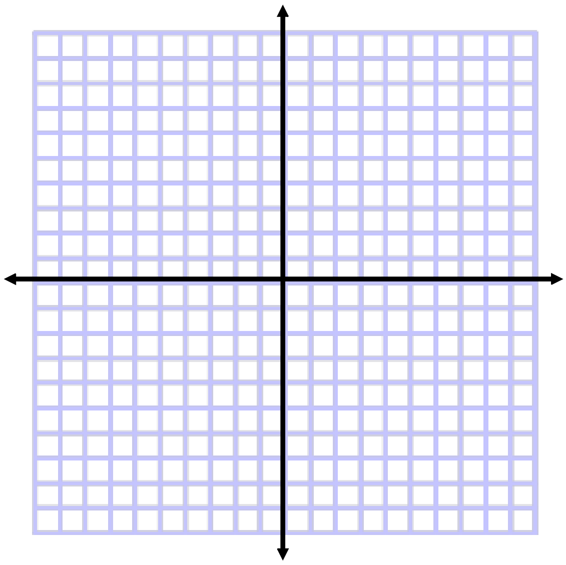
Solving inequalities graphically.

Solve: $|x-4|=6$



Solve: $|2x-2|=6$



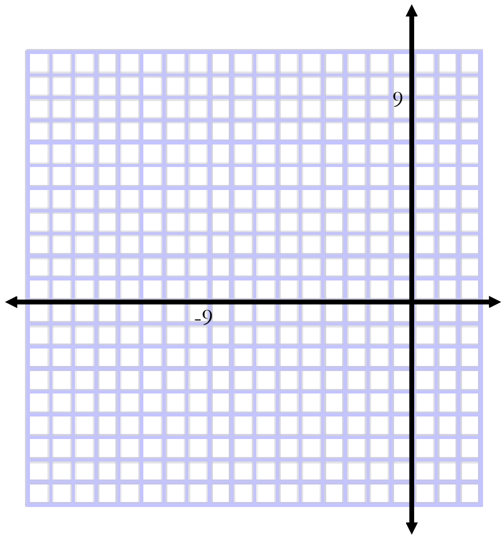
When solving questions involving absolute value, both parts of the piecewise function must be examined individually.

Solve for x: $|x+9|=7$

x-intercept:

So: $|x+9|=\begin{cases} x+9, \ for \quad x \geq -9 \\ -(x+9), \ for \ \ x<-9 \end{cases}$

Case 1: Case 2:



Solve for x: $|3x-6|=12$

Explain why $|2x+3|=-11$ cannot exist. (has no solution)

Practice: page 389 #2bc, 4abc

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Absolute Value equations with extraneous solutions.

$$Solve: |2x - 5| = 5 - 3x$$

You MUST VERIFY ANY EQUATIONS OF THIS TYPE!!!!

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Solve:

$$|x+5| = 4x - 1$$

page 389 #5

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