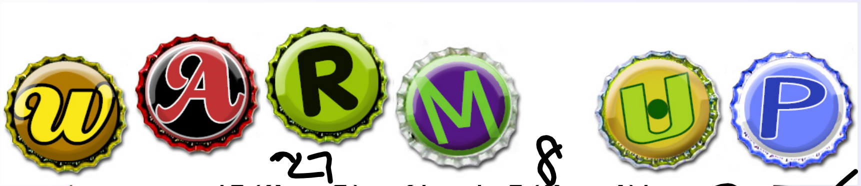


1. $|3(8 + 3) - 6| + |-2(8 - 4)|$ 35
2. $|-5(-12 - 8)| + |-42|$ 142
3. $|-5(15 + 8)| + 13$ 128
4. $|5(-6 - 4) - 10| + |-2(3 + 5)|$ 76
5. $|8(12 + 2) + 20| + |6(-8 - 5)|$ 210
7. $(|-25|)(|-6 - 4|)$ 250
8. $|10(16 - 25)| - |-8 + 12|$ 86
9. $|12 - 20| + |16 + 8| + |-22 - 6|$ 60

Mar 25-3:27 PM

Pre-Calculus 110
Unit 6: Absolute Value Functions and Equations

May 15, 2019: Day #2

1. Any Questions?
p. 363-367
#1 ace, 2, 4, 5, 6 acde, 7 ace, 8, 10, 12, 14, 18, 21, 22, 23

Jan 29-9:28 AM

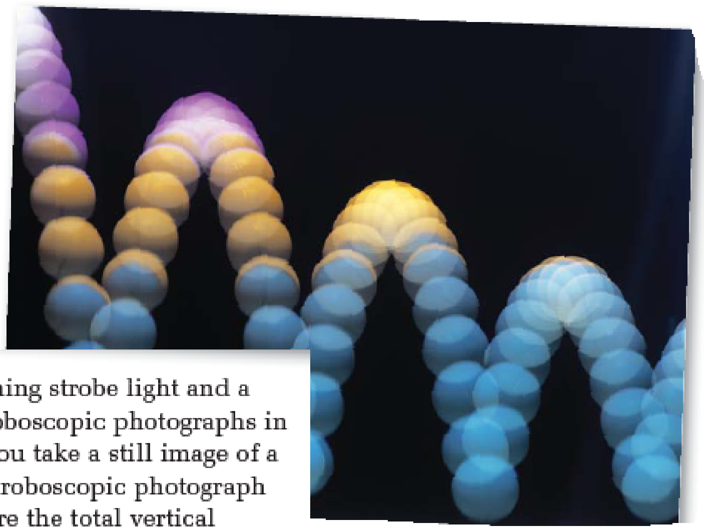
Curriculum Outcomes

AN1: Demonstrate an understanding of the absolute value of real numbers.

RF2. Graph and analyze absolute value functions (limited to linear and quadratic functions) to solve problems.

7.2

Absolute Value Functions



Stroboscopic photography involves using a flashing strobe light and a camera with an open shutter. You must take stroboscopic photographs in darkness so that every time the strobe flashes, you take a still image of a moving object at that instant. Shown here is a stroboscopic photograph following the path of a bouncing ball. To measure the total vertical distance the ball travels as it bounces over a certain time interval, use the absolute value of the function that models the height over time. What type of function would you use to model the height of this bouncing ball over time?

May 14-6:49 PM

Investigate Absolute Value Functions

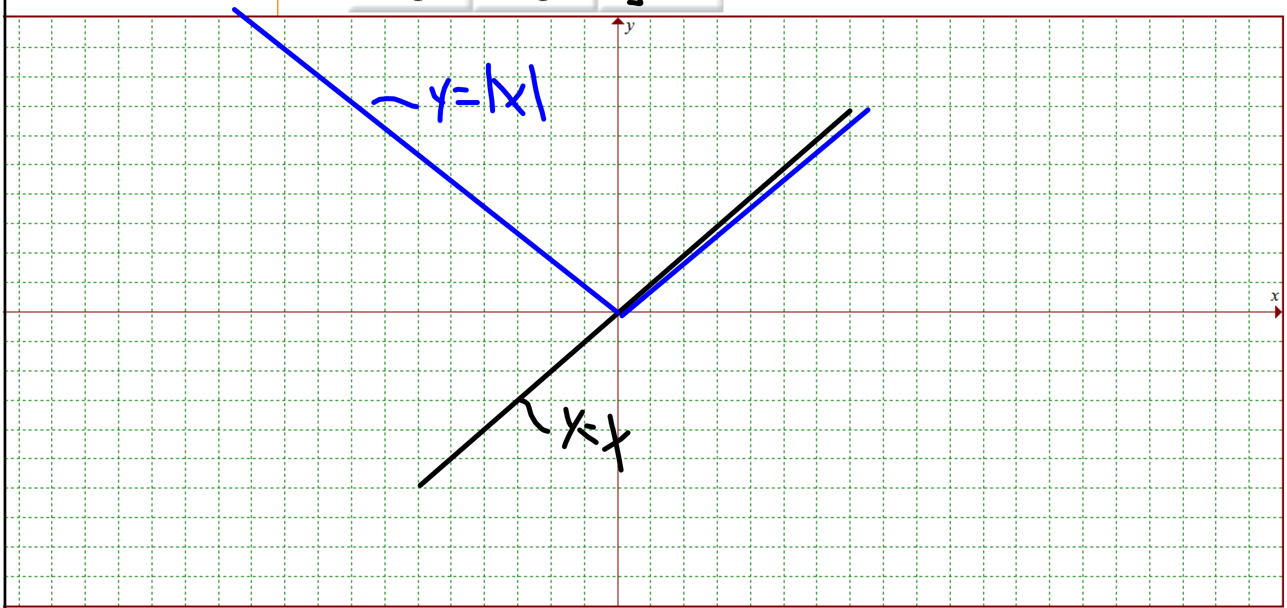
In this activity, you will explore the similarities and differences between linear, quadratic, and absolute value functions.

Part A: Compare Linear Functions With Corresponding Absolute Value Functions

Consider the functions $f(x) = x$ and $g(x) = |x|$.

1. Copy the table of values. Use the values of $f(x)$ to determine the values of $g(x)$ and complete the table.

x	$f(x)$	$g(x)$
−3	−3	3
−2	−2	2
−1	−1	1
0	0	0
1	1	1
2	2	2
3	3	3



Reflect and Respond

3. Which characteristics of the two graphs are similar and which are different?
4. From the graph, explain why the absolute value relation is a function.
5. a) Describe the shape of the graph of $g(x)$.
   b) If you could sketch the graph of $g(x)$ using two linear functions, what would they be? Are there any restrictions on the domain and range of each function? If so, what are they?

Part B: Compare Quadratic Functions With Corresponding Absolute Value Functions

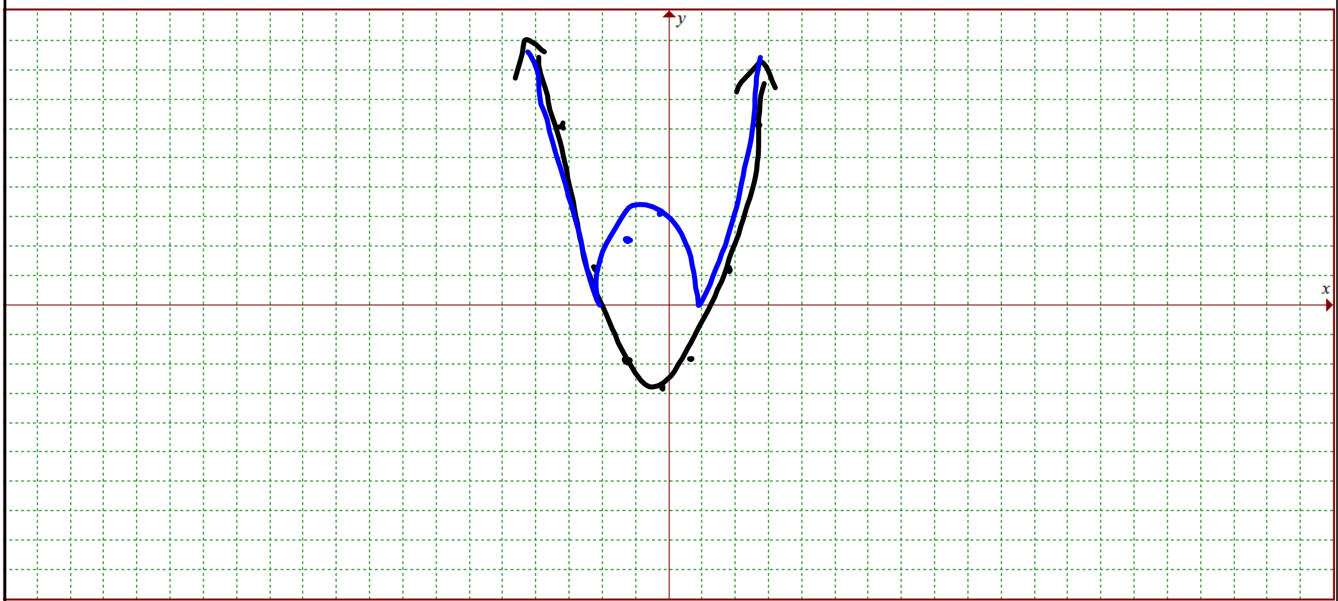
Consider the functions $f(x) = x^2 - 3$ and $h(x) = |x^2 - 3|$.

6. Copy the table of values. Use the values of $f(x)$ to determine the values of $h(x)$ and complete the table.

x	$f(x)$	$h(x)$
−3	6	6
−2	1	1
−1	−2	2
0	−3	3
1	−2	2
2	1	1
3	6	6

When are the values of $f(x)$ and $h(x)$ the same and when are they different?

7. Use the coordinate pairs to sketch the graphs of $f(x)$ and $h(x)$ on the same grid.



May 14-6:54 PM

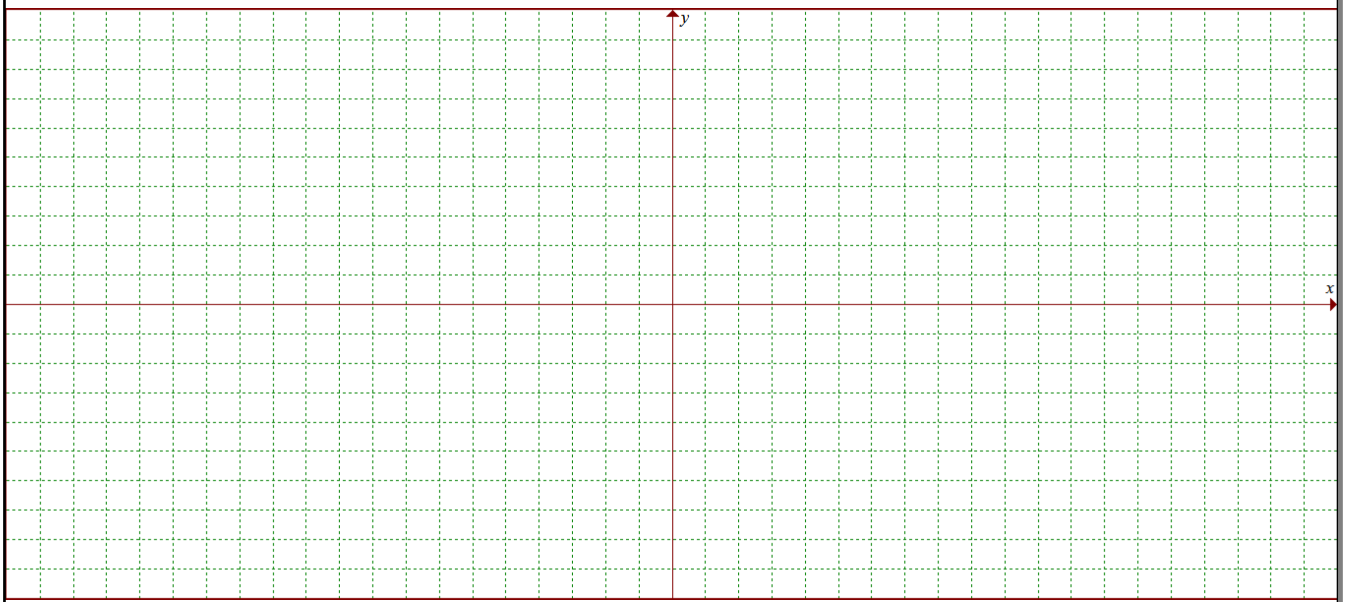
Reflect and Respond

8. Which characteristics of the two graphs are similar and which are different?

9. a) For what values of x are the graphs of $f(x)$ and $h(x)$ the same? different?

b) If you could sketch the graph of $h(x)$ using two quadratic functions, what would they be? Are there any restrictions on the domain and range of each function? If so, what are they?

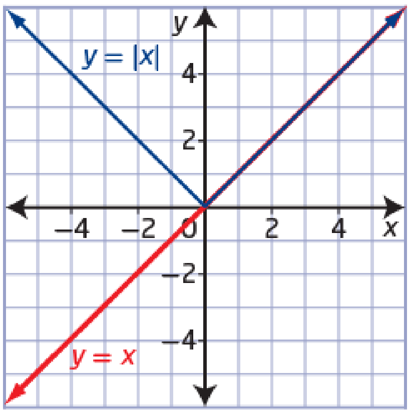
10. Describe how the graph of a linear or quadratic function is related to its corresponding absolute value graph.



May 22-1:24 PM

absolute value function

- a function that involves the absolute value of a variable



piecewise function

- a function composed of two or more separate functions or *pieces*, each with its own specific domain, that combine to define the overall function
- the absolute value function $y = |x|$ can be defined as the piecewise function

$$y = \begin{cases} x, \text{ if } x \geq 0 \\ -x, \text{ if } x < 0 \end{cases}$$

May 14-6:57 PM

Example 1

Graph an Absolute Value Function of the Form $y = |ax + b|$

Consider the absolute value function $y = |2x - 3|$.

a) Determine the y-intercept and the x-intercept.

b) Sketch the graph.

c) State the domain and range.

d) Express as a piecewise function.

a) let $x=0$

$y=|2(0)-3|$

$y=|-3|$

$=3$

y-int $(0,3)$

let $y=0$

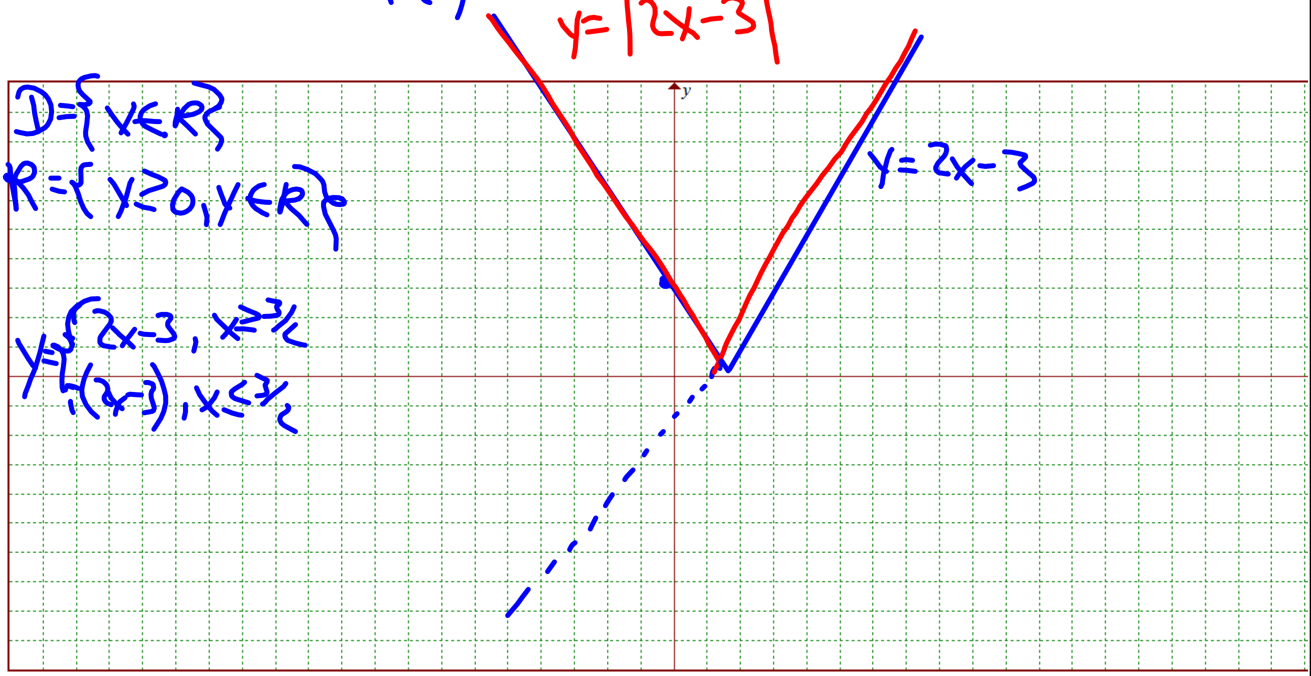
$0=|2x-3|$

$2x-3=0$

$2x=3$

$x=3/2$

$(3/2,0)$



$D=\{x\in R\}$

$R=\{y\geq 0, y\in R\}$

$y=\begin{cases} 2x-3, & x\geq 3/2 \\ -(2x-3), & x<3/2 \end{cases}$

Your Turn

Consider the absolute value function $y = |3x + 1|$.

a) Determine the y-intercept and the x-intercept.

b) Sketch the graph.

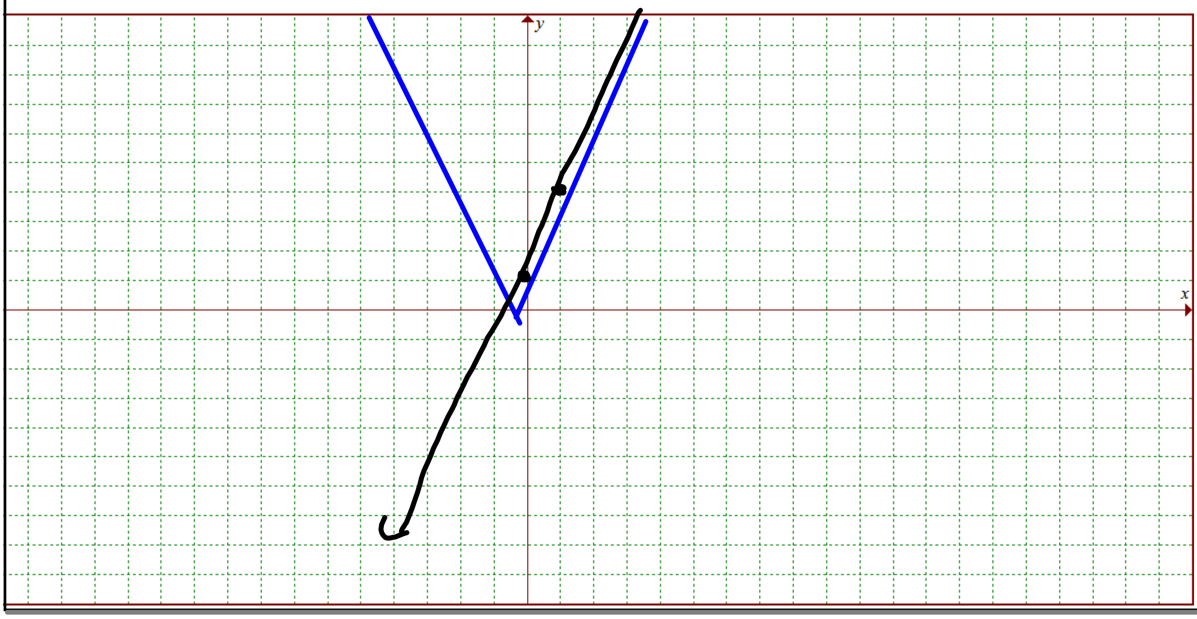
c) State the domain and range.

d) Express as a piecewise function.

$y = 3x + 1$

$(0, 1)$

$(1, 4)$



Example 2

Graph an Absolute Value Function of the Form $f(x) = |ax^2 + bx + c|$

Consider the absolute value function $f(x) = |-x^2 + 2x + 8|$.

a) Determine the *y*-intercept and the *x*-intercepts.

b) Sketch the graph.

c) State the domain and range.

d) Express as a piecewise function.

y int $= 8$

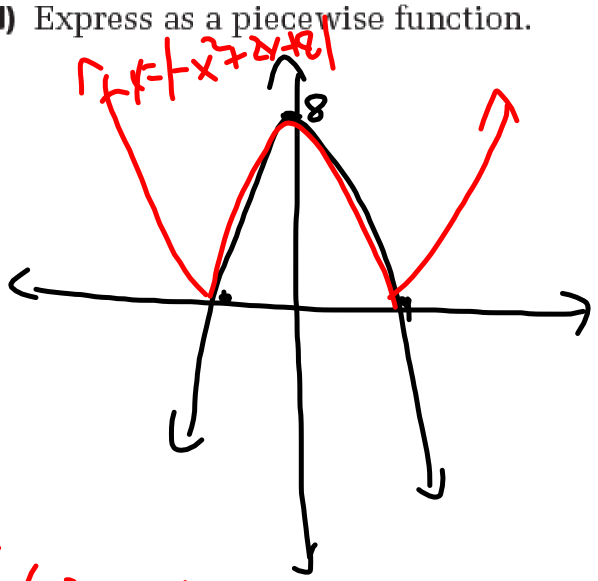
x int

$-x^2+2x+8=0$

$x^2-2x-8=0$

$(x-4)(x+2)=0$

$x=4$ or -2



$$\begin{cases} -(-x^2+2x+8) & x<-2 \\ -x^2+2x+8 & -2\le x\le 4 \\ -(-x^2+2x+8) & x>4 \end{cases}$$

Your Turn

Consider the absolute value function $f(x) = |x^2 - x - 2|$.

a) Determine the y-intercept and the x-intercepts.

b) Sketch the graph.

c) State the domain and range.

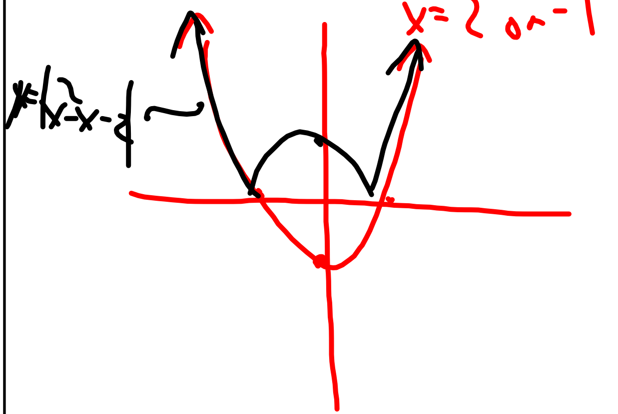
d) Express as a piecewise function.

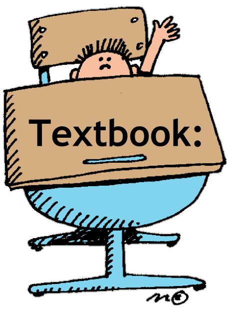
a) $y = -2$ $(0, -2)$

$y^2 - x - 2 = 0$

$(y-2)(y+1) = 0$

$x = 2$ or -1





Minimum Preparation:

- p. 375-378

1 a, 2, 3, 4, 5ac, 6ace, 7ab, 8ace, 9, 10, 11ac, 12, 13, 15, 17, 19

Jan 29-10:15 AM

May 24-8:55 AM

Standard Form Demor.GSP

Warm ups.notebook