

# Today's Plan:

**Learning Target (standard):** I will describe quadratic equations as functions. I will graph quadratic functions.

**Students will:** Complete practice problems over previous concepts at the boards, put up homework problems on the board and make necessary corrections to their own work, take notes over new material and complete practice problems over new concepts.

**Teacher will:** Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

**Assessment:** Board work, homework check and homework assignment

**Differentiation:** Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.

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$$|-10+11| = |1|$$

**BELL RINGER**

1.) Solve  $|-10 + x|$  for  $x = 11$ .

①

2.) Write a linear equation to represent the cost,  $C$ , to ride in a taxi cab that charges a flat fee of \$4.00 and \$0.50 per mile.

$$y = mx + b$$

$$C = .5x + 4$$

3.) Simplify  $\frac{(6+4)^2}{-5} = \frac{10^2}{-5} = \frac{100}{-5} = \textcircled{-20}$

Tell which direction the parabola opens. Find the vertex.

$$6) f(x) = -3(x-7)^2 + 9$$

1) opens: down  $\rightarrow$  maximum

2) vertex: (7, 9)

Tell which direction the parabola opens. Find the vertex.

$$9) f(x) = -2x^2 - 20x - 52$$

1) opens: down  $\rightarrow$  maximum

2) vertex: (-5, -2)  
 $x = -\frac{b}{2a} = \frac{20}{2(-2)} = \frac{20}{-4} = -5$

$$\begin{aligned} f(-5) &= -2(-5)^2 - 20(-5) - 52 \\ &= -50 + 100 - 52 \end{aligned}$$

$$f(-5) = -2$$

Tell which direction the parabola opens. Find the vertex.

$$f(x) = -\frac{3}{4}(x+2)^2 + 6$$

$x+2=0$   
 $x=-2$

1) opens: **down** → maximum

2) vertex: **(-2, 6)**

Tell which direction the parabola opens. Find the vertex.

$$f(x) = -3(x-8)^2 + 7$$

$x-8=0$   
 $x=8$

1) opens: **down** → maximum

2) vertex: **(8, 7)**

Tell which direction the parabola opens. Find the vertex.

$$f(x) = -3x^2 - 12x - 5$$

1) opens: down  $\rightarrow$  maximum

2) vertex:  $(-2, 7)$

$$x = -\frac{b}{2a} = \frac{12}{2(-3)} = \frac{12}{-6} = -2$$

$$f(-2) = -3(-2)^2 - 12(-2) - 5$$

$$= -3(4) + 24 - 5$$

$$= -12 + 24 - 5$$

$$f(-2) = 7$$

Tell which direction the parabola opens. Find the vertex.

$$f(x) = 2x^2 - 16x + 1$$

1) opens: up  $\rightarrow$  minimum

2) vertex:  $(4, -31)$

$$x = -\frac{b}{2a} = \frac{16}{2(2)} = \frac{16}{4} = 4$$

$$f(4) = 2(4)^2 - 16(4) + 1$$

$$= 32 - 64 + 1$$

$$f(4) = -31$$

Tell which direction the parabola opens. Find the vertex.

$$f(x) = -x^2 - 4x + 3$$

1) opens: **down** → maximum

2) vertex:  **$(-2, 7)$**

$$x = -\frac{b}{2a} = \frac{4}{2(-1)} = \frac{4}{-2} = -2$$

$$\begin{aligned} f(-2) &= -(-2)^2 - 4(-2) + 3 \\ &= -4 + 8 + 3 \end{aligned}$$

$$f(-2) = 7$$

Properties of Quadratic Equations: **Process for Graphing**

1) direction the parabola opens:

$$f(x) = a(x - h)^2 + k$$

$$f(x) = ax^2 + bx + c$$

Properties of Quadratic Equations:

2) vertex:

$$f(x) = a(x - h)^2 + k$$

$$f(x) = ax^2 + bx + c$$

Properties of Quadratic Equations:

3) Axis of Symmetry (AOS):

Properties of Quadratic Equations:

4) *t*-chart

X	Y
Vertex	

Graph.

$$f(x) = 2x^2 + 8x + 6$$

1) opens up  $\rightarrow$  minimum

2) vertex:  $(-2, -2)$

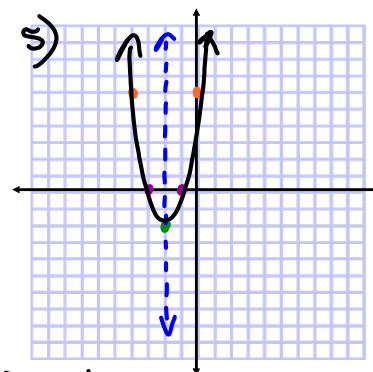
$$x = -\frac{b}{2a} = \frac{-8}{2(2)} = \frac{-8}{4} = -2$$

$$f(-2) = 2(-2)^2 + 8(-2) + 6$$

$$= 8 - 16 + 6$$

$$f(-2) = -2$$

3) AOS:  $x = -2$



4)

x	y
* -4	6
* -3	0
-2	-2 (vertex)
* -1	0
* 0	6

$$f(0) = 2(0)^2 + 8(0) + 6$$

$$= 0 + 0 + 6$$

$$f(0) = 6$$

$$f(-1) = 2(-1)^2 + 8(-1) + 6$$

$$= 2 - 8 + 6$$

$$f(-1) = 0$$

Graphing Quadratic Equations:

$f(x) = 2x^2 - 1$

1) opens up  $\rightarrow$  minimum

2) vertex:  $(0, -1)$

$x = -\frac{b}{2a} = \frac{0}{2(2)} = 0$

$f(0) = 2(0)^2 - 1$   
 $= 0 - 1$   
 $f(0) = -1$

3) AOS:  $x = 0$

4) 

x	y
-2	7
-1	1
0	-1
1	1
2	7

 $f(-2) = 2(-2)^2 - 1$   
 $= 8 - 1$   
 $f(-2) = 7$

$f(1) = 2(1)^2 - 1$   
 $= 2 - 1$   
 $f(1) = 1$

Graph.

$f(x) = x^2 - 2x - 2$

1) opens up  $\rightarrow$  minimum

2) vertex:  $(1, -3)$

$x = -\frac{b}{2a} = \frac{2}{2(1)} = \frac{2}{2} = 1$

$f(1) = (1)^2 - 2(1) - 2$   
 $= 1 - 2 - 2$   
 $f(1) = -3$

3) AOS:  $x = 1$

4) 

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

 $f(-1) = (-1)^2 - 2(-1) - 2$   
 $= 1 + 2 - 2$   
 $f(-1) = 1$

$f(0) = (0)^2 - 2(0) - 2$   
 $= 0 - 0 - 2$   
 $f(0) = -2$



# Assignment:

## Graphing Quadratic Equations

#1-4