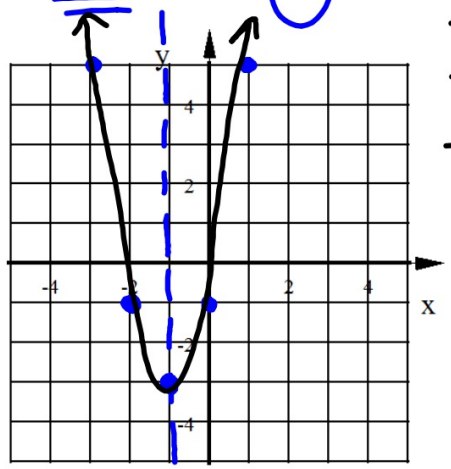
1. $y = 2x^2 + 4x - 1$

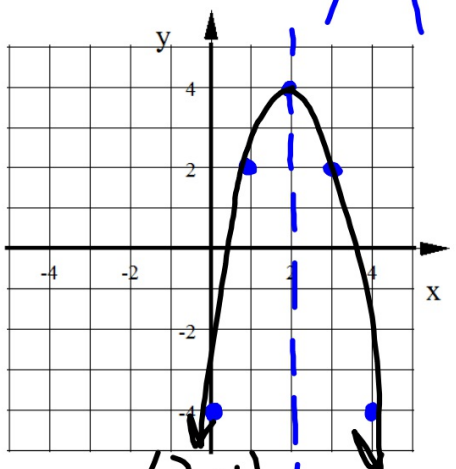


x	y
-2	-1
-1	-3
0	-1
1	5
2	15

Vertex: (-1, -3)

EQ of LOS: $x = -1$

2. $y = -2x^2 + 8x - 4$



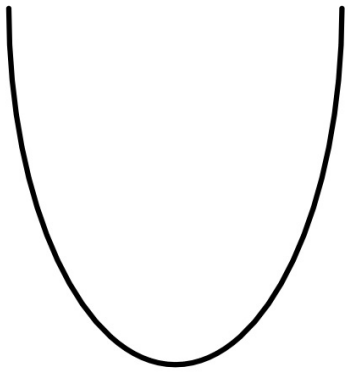
x	y
-2	-28
-1	-14
0	-4
1	2
2	4
3	2
4	-4

Vertex: (2, 4)

EQ of LOS: $x = 2$

Hwk #23

What do we call this graph? Parabola



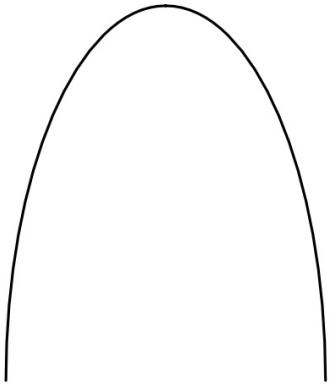
What equation gives this graph?

Quadratic $y = ax^2 + bx + c$

Standard Form
of a Quadratic Function

Vertex

The Highest or Lowest point on a Parabola. (depending on which way it opens)



Line of Symmetry (LOS)

Fold line that divides to the parabola into two matching halves

VERTICAL line that passes through the middle of the parabola

EQ: x = #

VERTICAL line that passes through the Vertex.

The Vertex is the only point of a Parabola that is ON the LOS

Quadratic Equation: $y = ax^2 + bx + c$

Parabola opens Up if: $a>0$ ⟶ Vertex is a Minimum

Parabola opens Down if: $a<0$ ⟶ Vertex is a Maximum

Does each parabola open up or down?

1. $y = -2.5x^2 + 38x + 106$ D

2. $f(x) = 0.31x^2 - 80x - 57$ U

3. $y = 61x^2 + 1$ U

Every parabola has either a Maximum or a Minimum.

Does each parabola have a Max or a Min?

A. $y = 2x^2 + 2x + 1$ min

B. $y = -3x^2 + 8x - 4$ max

C. $y = 7x^2 - 10x - 3$ min.

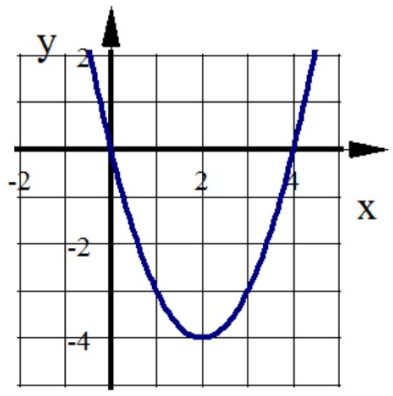
Does each parabola have a Maximum or a Minimum?

1. $f(x) = 16x^2 - 8x + 11$ ∪ = min

2. $y = -1.609x^2 + 13x + 3$ max

3. $y = -x^2 - 2.4x - 0.75$ max

9. Use the graph below. State the coordinates of the vertex and the equation of the LOS:



Coord of Vertex: (2, −4)

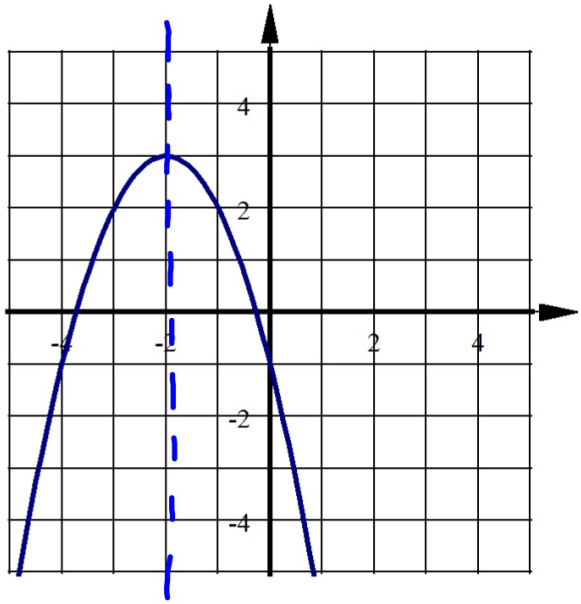
Eq of LOS: $x = 2$

10. If the vertex of a parabola is the point $(-13, 8)$ write the equation of the LOS.

$X = -13$

11. If the axis of symmetry of the parabola $y = -2x^2 + 24x + 11$ is $x = 6$ ~~find the coordinates of the Vertex.~~

$(6, 83)$

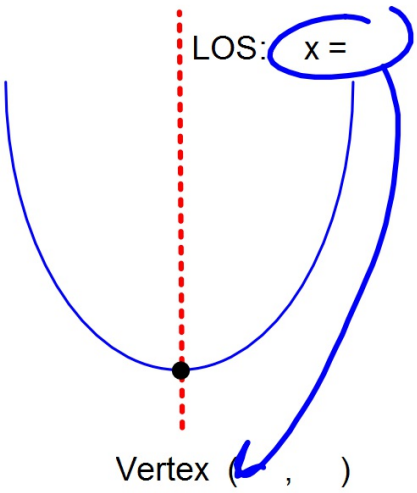


What are the coordinates of the Vertex?

(-2, 3)

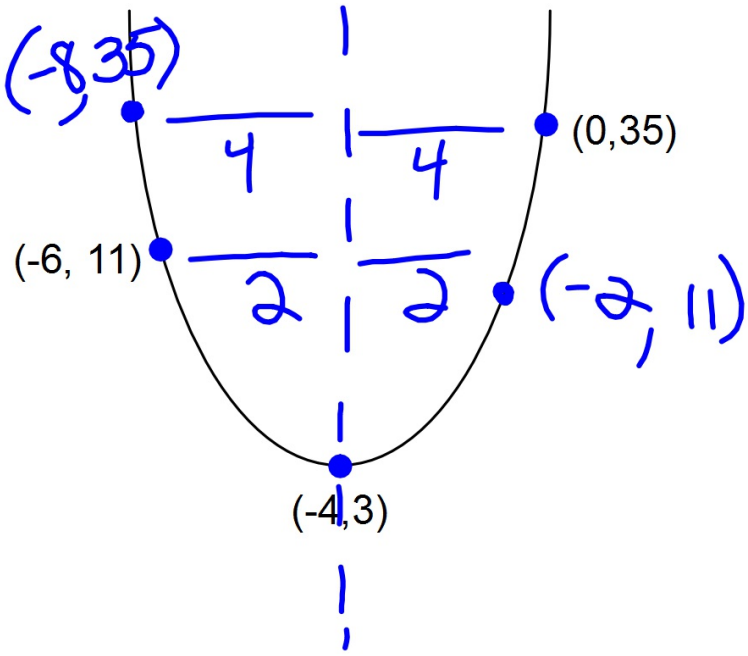
What is the equation of the Line of Symmetry?

x = -2



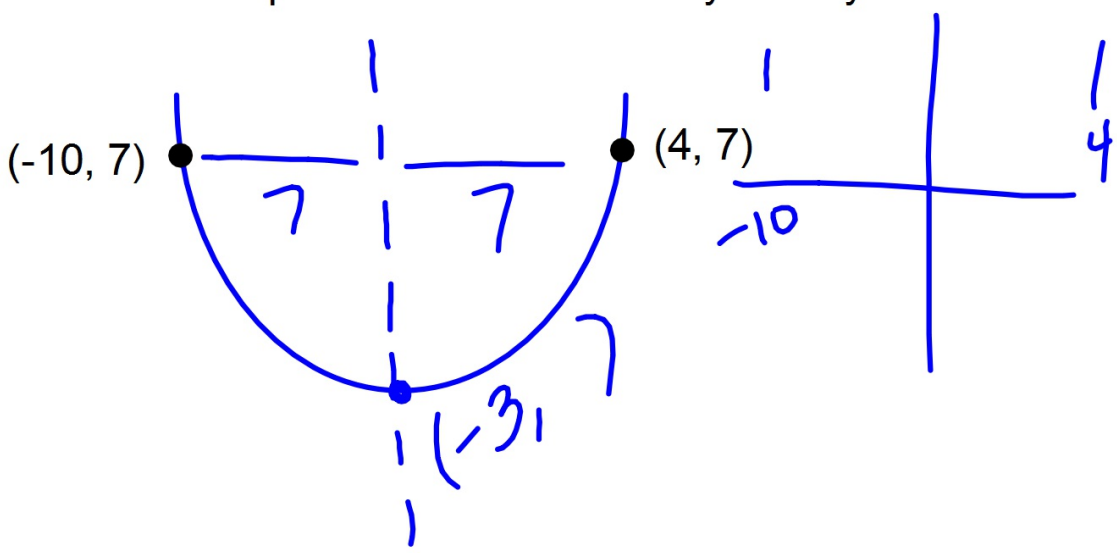
How are the coordinates of the Vertex and the equation for the Line of Symmetry related?

the x-coordinate of the Vertex is the same as the equation for the LOS.



Find the coordinates of two other points on this parabola.

What is the equation for the Line of Symmetry?



The vertex of a parabola is (15,-8)

What is the equation of the Line of Symmetry?

$X = 15$

Given the Quadratic Function $y = -2x^2 + 12x - 7$

The equation for the Line of Symmetry is $x = 3$

Find the coordinates of the vertex. $(3, 11)$

Graphs of a parabolas Exploration

Do part 1

Standard Window

Part 1 Changing the size of a

In Y_2 try graphing $y = ax^2$ with different values of a, but keeping it positive.
Notice what happens to the graph when you change the size of a.

How does the size of a affect the shape of the graph?

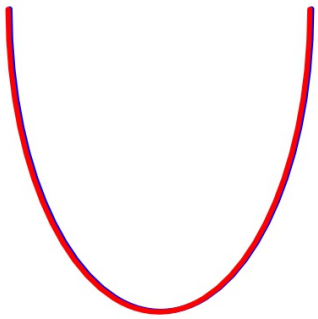
The larger the value of a ..... the more narrow the parabola.

The smaller the value of a ..... the wider the parabola.

Actually the parabolas don't get wider or narrower

they get taller and shorter.....

a is a Vertical Stretch or Vertical Shrink Factor



If you take the absolute value of a:

The smaller |a| is the wider the parabola shorter

The larger |a| is the more narrow the parabola taller

Finish this sentence: The closer the value of a is to zero the Wider the parabola.

Finish this sentence: The further the value of a is from zero the Narrower the parabola.

13. Place the following quadratics in order from widest to narrowest.

A. $y = -4x^2 + 6x - 9$

B. $y = x^2 - 8x + 17$

C. $y = 0.15x^2 + 3x - 1$

D. $y = -9x^2 - 10x + 5$

E. $y = -0.5x^2 + 4x + 30$

W _____ N

C E B A D

Place these in order from Widest to Narrowest.

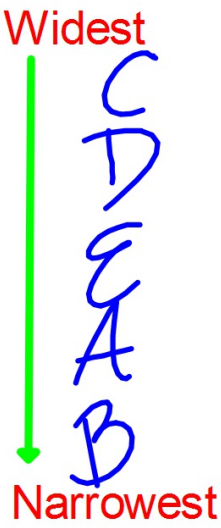
A. $y= -6x^2$

B. $y= 7x^2$

C. $y= 0.37x^2$

D. $y= -0.41x^2$

E. $y= -x^2$



Now do Part 2 of the Exploration

Part 2 Changing the value of c.

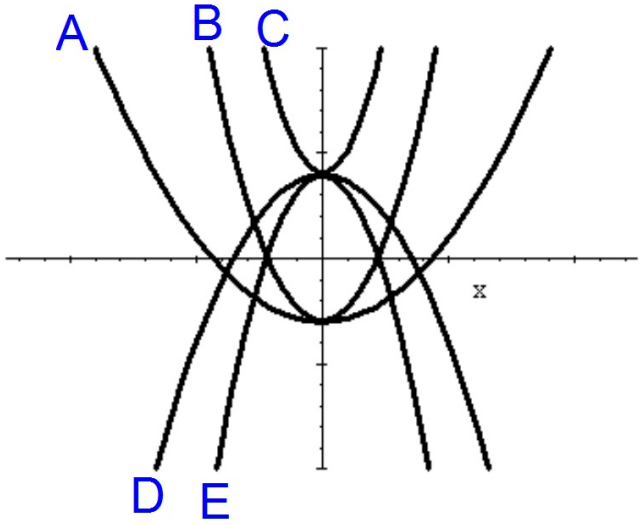
In Y_2 try graphing $y = x^2 + c$ for different values of c, both positive and negative.
Notice what happens to the location of the graph when you change the value of c.

How does the value of c affect the location of the graph?

c shifts up/down
changes y int

Step 7 Without using a calculator, match each equation below with its graph.

1. $y = 4x^2 - 3$ B
2. $y = -2x^2 + 4$ D
3. $y = x^2 - 3$ A
4. $y = -5x^2 + 4$ E
5. $y = 7x^2 + 4$ C



The graph of $y=ax^2 + c$

a

$a>0$	$a<0$
Opens Up	Opens Down
smaller a	bigger a
Wider	Narrower

c

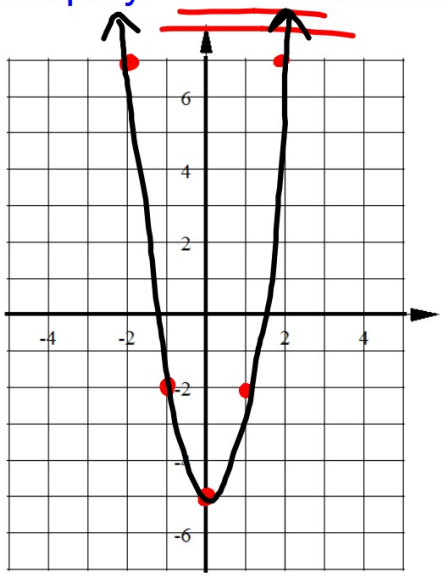
$c>0$	$c<0$
Moves Up	Moves Down

Vertex (0 , c)

Find the coordinates of the vertex and the equation of the LOS for each quadratic.

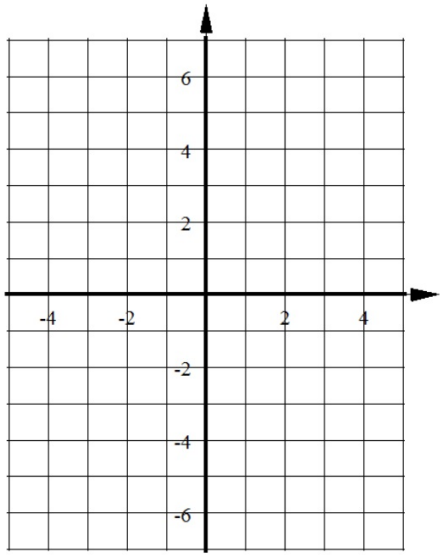
Equation	Vertex	Eq of LOS
1. $y = x^2 - 3$	(0, -3)	X = 0
2. $y = 5x^2 + 7$	(0, 7)	X = 0

Graph $y = 3x^2 - 5$ with at least 5 points



x	y
-2	7
-1	-2
0	-5
1	-2
2	7

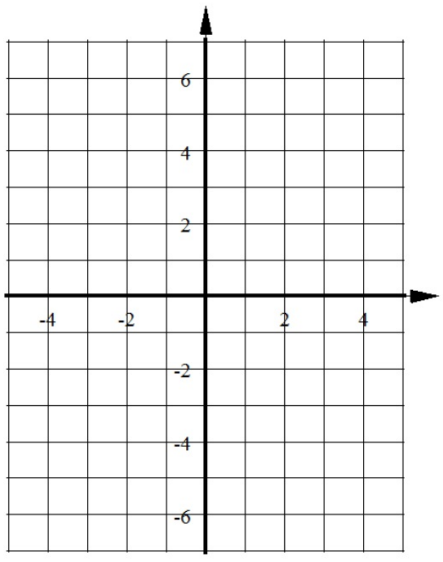
Graph $y = -2x^2 + 7$ with at least 5 points



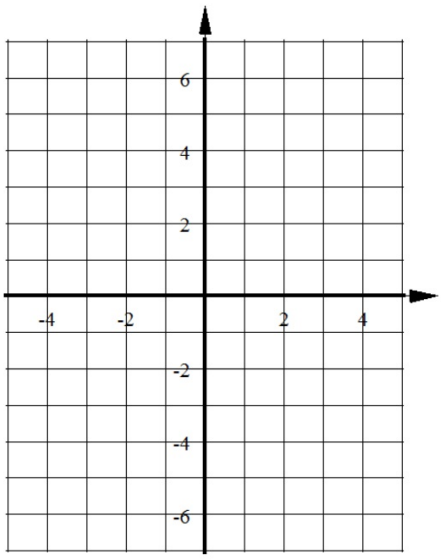
Graph each parabola using at least five points.

1. $y = 2x^2 - 6$

2. $y = -x^2 + 3$



1. $y = 2x^2 - 6$



2. $y = -x^2 + 3$

You can now do Hwk #24

Sect. 10-1

Pages 513-515

Problems 1, 2, 7, 9, 12, 13, 15, 21-26, 46

Use the sheet of paper I've already printed out.

IXL #13 - AA.7 & BB.1 due tomorrow by 4pm!