Solve: $5 - 3|x - 4| \geq -4$

$1 \leq x \leq 7$

Case 1: BBP

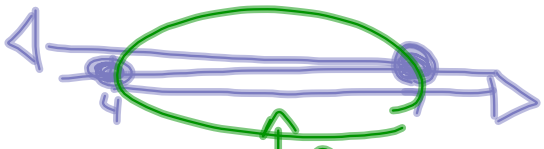
$x - 4 \geq 0$

$x \geq 4$

$5 - 3x + 12 \geq -4$

$-3x \geq -21$

$x \leq 7$



True for Both !!

"OR" $4 \leq x \leq 7$

Case 2: BBN

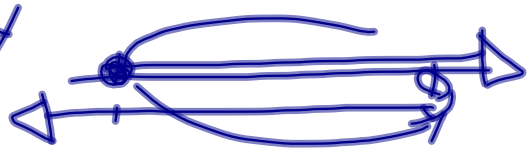
$x < 4$

$5 + 3(x - 4) \geq -4$

$3x - 7 \geq -4$

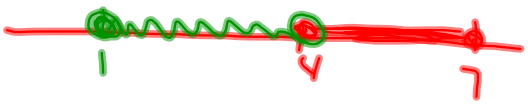
$3x \geq 3$

$x \geq 1$



$1 \leq x < 4$

Now Join these sets...



$1 \leq x \leq 7$ or $7 \geq x \geq 1$ ✓

Quiz: Thursday

(1) Factoring ⇒ Handouts

→ Perfect Square Trinomials

→ Grouping

→ Substitutions

ex: $(3w^2-1)^2-6(3w^2-1)+5$

$m=3w^2-1$

m^2-6m+5

$(m-5)(m-1)$

$(3w^2-1-5)(3w^2-1-1)$

$(3w^2-6)(3w^2-2)$

$\boxed{3(w^2-2)(3w^2-2)}$

(2) Absolute Value functions — sec 7.1, 7.2, 7.3

→ Linear & Quadratic

→ Graphs & Properties (Linear)

(2) Absolute Value Equations

→ Linear & Quadratic

(3) Absolute Value Inequations ← Handout

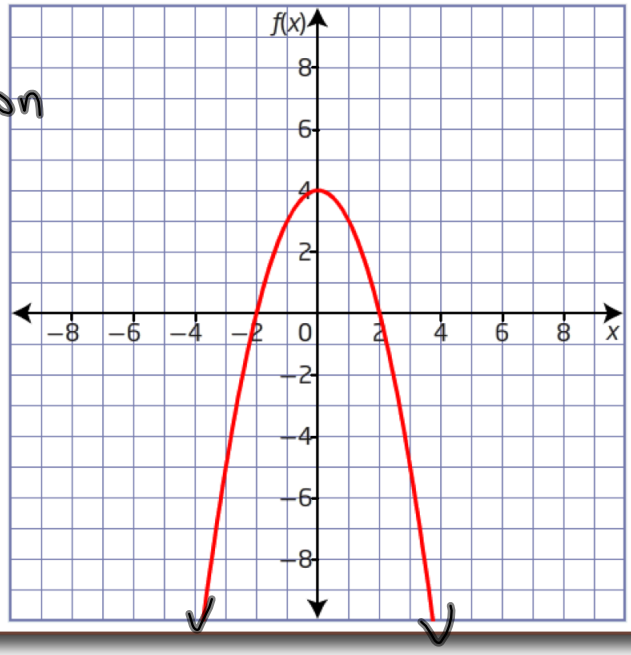
→ Linear ONLY

Quadratic Functions

For the quadratic function below, determine the following:

a) the direction of opening Down
b) the coordinates of the vertex (0,4)
c) the maximum or minimum value Max = 4
d) the equation of the axis of symmetry $x = 0$
e) the *x*-intercepts and *y*-intercept $x = \pm 2, 4$
f) the domain and range

D: $x \in \mathbb{R}$ $y \leq 4$



Answer

Quadratic Functions

Investigating Quadratic Functions in Vertex Form

$y = x^2$

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

$|a| > 1$ Narrower

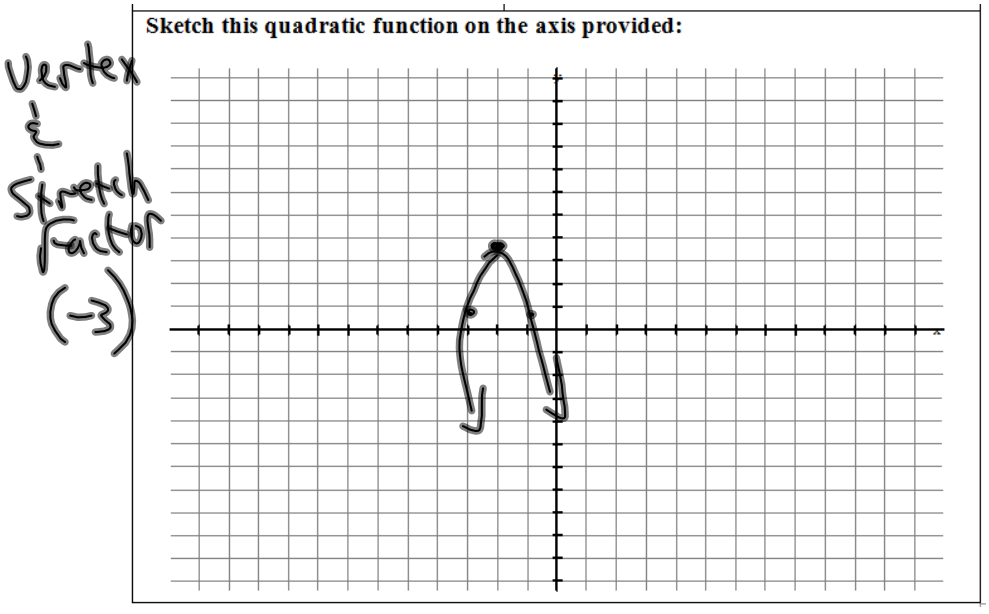
$0 < |a| < 1$ Wider

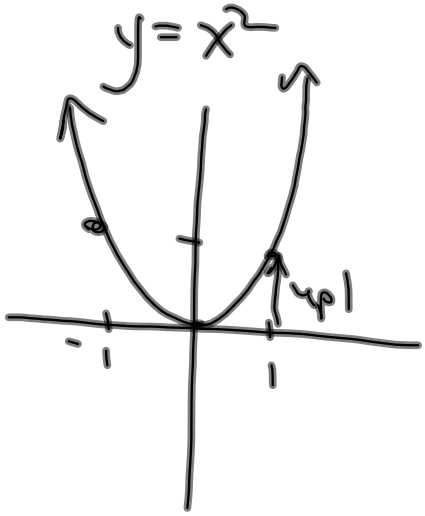
Activate Prior Knowledge...

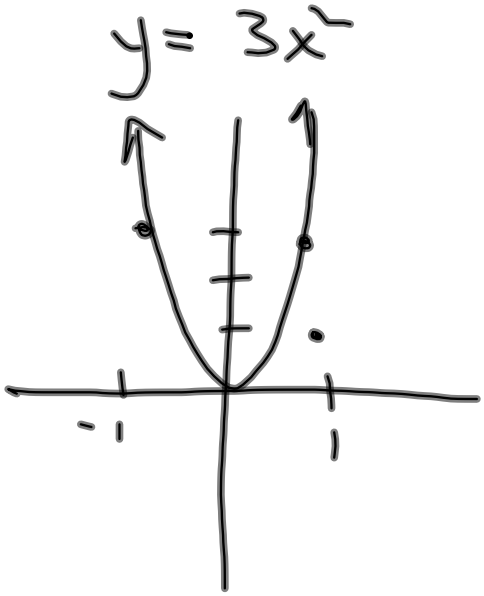
Using the properties of the quadratic function shown below complete the chart provided: $y = -3(x+2)^2 + 4$

Vertex	$(-2, 4)$
y-Intercept	$(0, -8)$ → $x=0$
Direction parabola opens	Down
Equation of axis of symmetry	$x=-2$
Domain	$x \in R$
Range	$y \leq 4$
Does function represent a maximum or minimum?	Max.
What is maximum or minimum value?	4

Sketch this quadratic function on the axis provided:




y = x²
1
-1
1


y = 3x²
-1
1

In Summary

Key Idea

- The vertex form of the equation of a quadratic function is written as follows:

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

The graph of the function can be sketched more easily using this form.

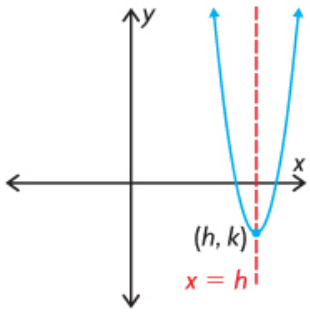
Need to Know

- A quadratic function that is written in vertex form,

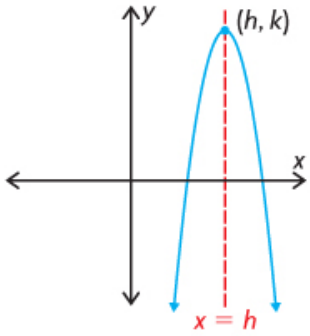
$$y = a(x - h)^2 + k$$

has the following characteristics:
  - The vertex of the parabola has the coordinates (h, k).
  - The equation of the axis of symmetry of the parabola is $x = h$.
  - The parabola opens upward when $a > 0$, and the function has a minimum value of k when $x = h$.
  - The parabola opens downward when $a < 0$, and the function has a maximum value of k when $x = h$.

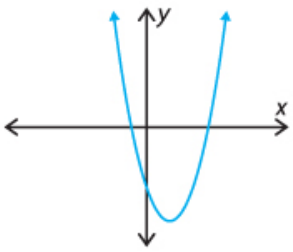
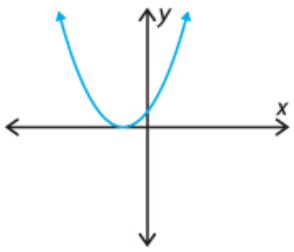
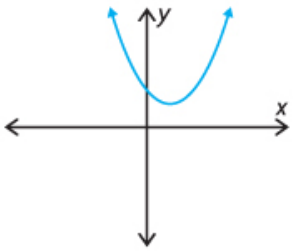
$y = a(x - h)^2 + k$
$a > 0$



$y = a(x - h)^2 + k$
$a < 0$



- A parabola may have zero, one, or two x-intercepts, depending on the location of the vertex and the direction in which the parabola opens. By examining the vertex form of the quadratic function, it is possible to determine the number of zeros, and therefore the number of x-intercepts.

Two x-intercepts	One x-intercept	No x-intercepts
		

Investigate Quadratic Functions in Standard Form

Activate some more prior knowledge...

Standard Form: $y = ax^2 + bx + c$

Using the properties of the quadratic function shown below complete the chart provided: $y = -2x^2 + 12x - 15$

Partial Factoring:

$y = -2x(x-6) - 15$

$x = 0$ or $x = 6$

Vertex: $x = \frac{0+6}{2} = 3$

$y = -2(3)^2 + 12(3) - 15$

$y = 3$

$(3,3) \Rightarrow y = -2(x-3)^2 + 3$

or

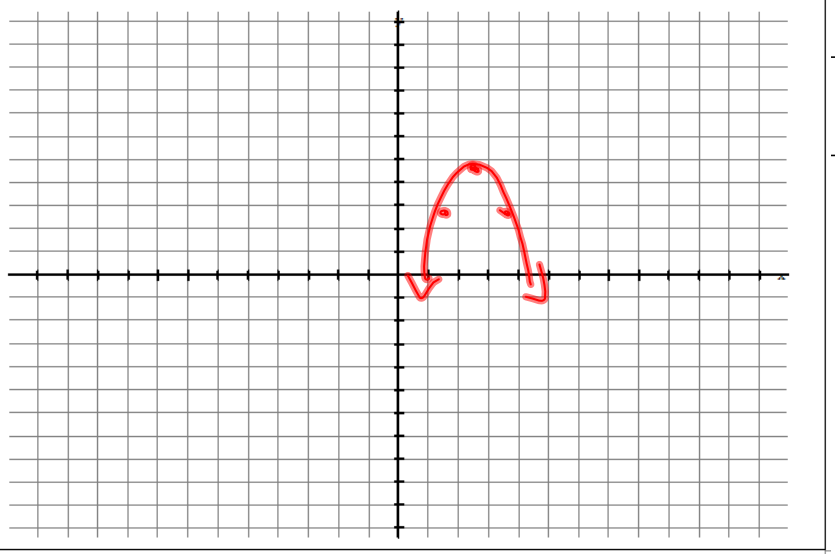
Completing the Square

$y = -2(x^2 - 6x + 9) - 15 + 18$ (-18)

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

Vertex	(3,3)
y-Intercept	(0,-15)
Direction parabola opens	Down
Equation of axis of symmetry	$x = 3$
Domain	$x \in R$
Range	$y \leq 3$
Mapping Notation	

Sketch this quadratic function on the axis provided:



Attachments

FM11-7s6-ahk.gsp