WARM UP – non-calculator

1) Multiply: $(2x - 5)(x + 3)$ $2x^2 + 6x - 5x - 15$

2) What two numbers have a product of -24 and a sum of -5?

$-8, 3$

3) What two numbers have a product of 9 and a sum of -6?

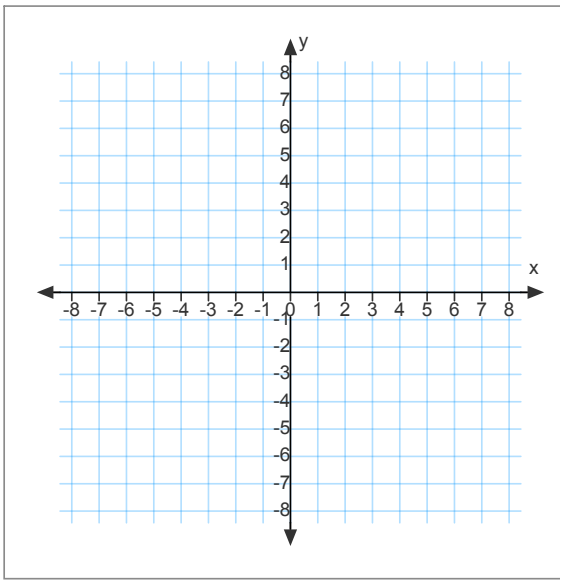
$-3, -3$

4) You may use your calculator to answer:

What is the lowest point (*vertex*) of $y = 5x^2 - 10x - 1$

$(1, -6)$

$2x^2 + x - 15$



5.1 Quadratic Equations and Functions

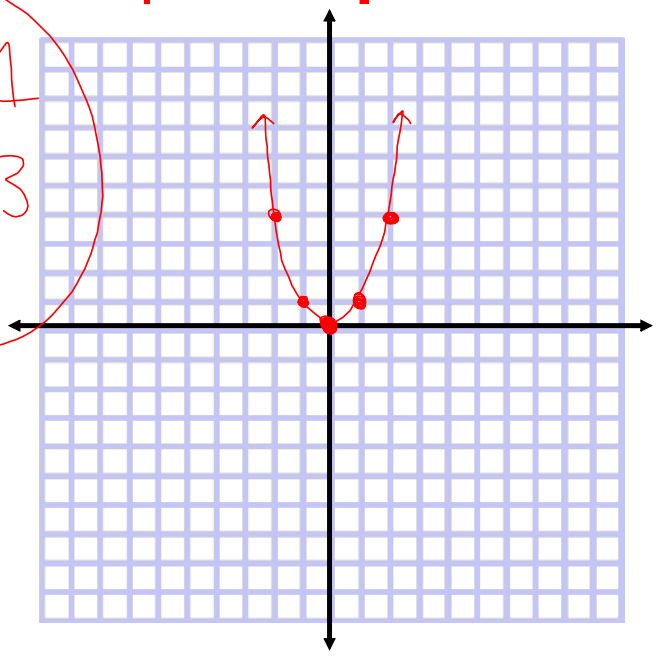
Standard Form of Quadratic Function

$f(x) = ax^2 + bx + c$ (when $a \neq 0$)

→ **Parent Function $f(x) = x^2$**

Graph is a **parabola**

over 1 up 1
over 1 up 3



Where do we see parabolas in the real world?

Classifying Functions

Determine whether each function is linear or quadratic. Identify the value of *a, b, c* in each problem.

or constant ax^2+bx+c

1) $y = (2x - 5)(x + 3)$ quadratic

FOIL! $2x^2+1x-15$ $a=2$ $b=1$ $c=-15$

2) $y = 6(x^2 - 4x) - 2(3x^2 + 7x)$ linear

$\cancel{6x^2}-24x-\cancel{6x^2}-14x=-38x$ $a=0$ $b=-38$ $c=0$

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

$x^2-(x^2-1)$ constant

$x^2-x^2+1=1$ $a=0$ $b=0$ $c=1$

Vocabulary

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

Vertex

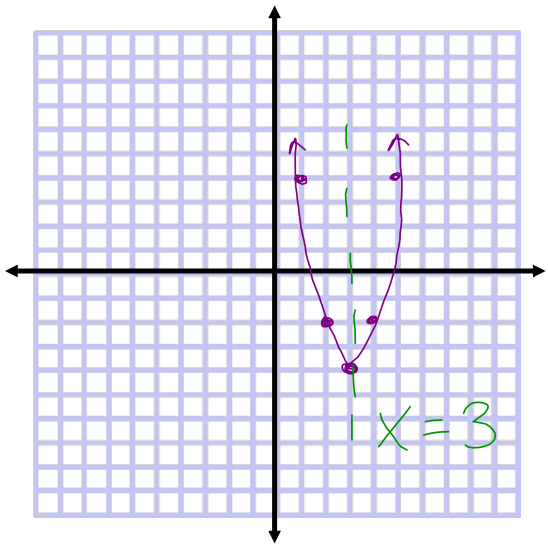
Minimum point

(when a > 0) a is positive

or

Maximum point

(when a < 0) a is negative



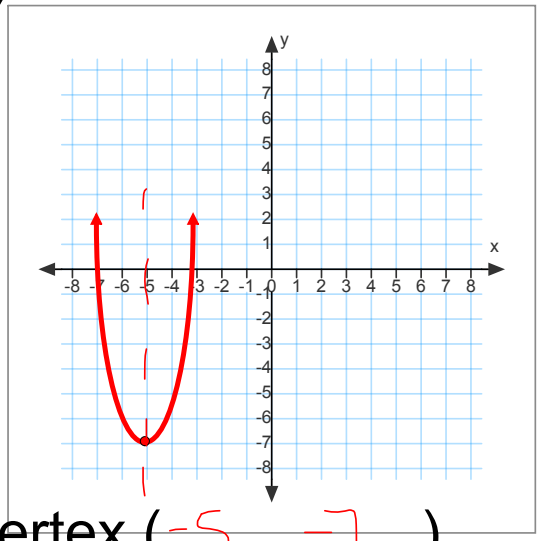
Axis of Symmetry is the line that divides a parabola into two parts that are mirror images.

Equation of AOS: x = x coord of vertex

Examples

Identify the vertex and axis of symmetry of each graph.

4)

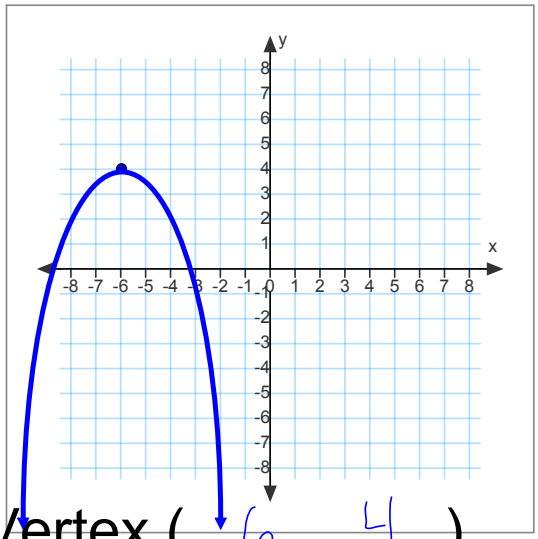


Vertex (-5 , -7)

Axis of Symmetry

$x = -5$

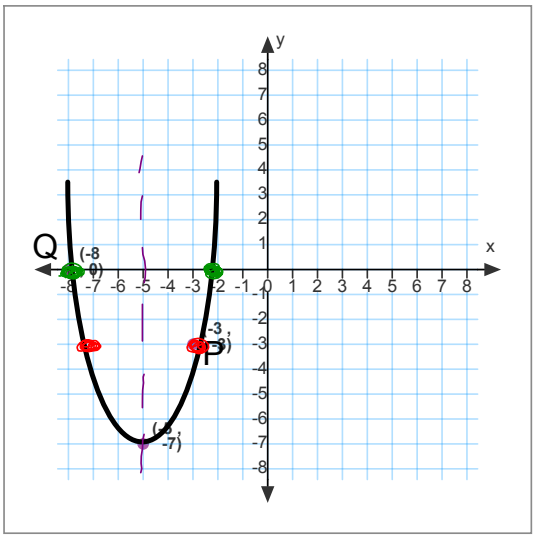
5)



Vertex (-6 , 4)

Axis of Symmetry

$x = -6$



For the parabola to the right, find corresponding points P' and Q' for the points P and Q.

V (-5, -7)

P (-3, -3) P' is (-7, -3)

Q (-8, 0) Q' is (-2, 0)

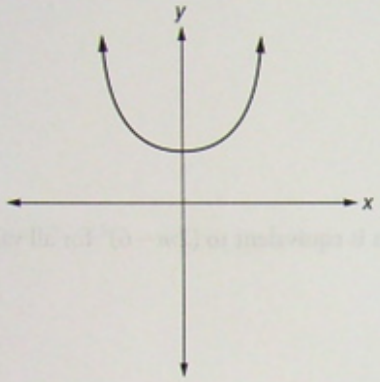
ACT
PRACTICE PROBLEMS

6. For the function $h(x) = 4x^2 - 5x$, what is the value of $h(-3)$?

A. -93
B. -9
C. 21
D. 51
E. 159

ACT-59F #19

7) If $f(x)$ is graphed in the following figure, then which of the following is a possible formula for $f(x)$?



(A) x^2
(B) $(x-4)^2$
(C) $(x+3)^2$
(D) x^2-2
(E) x^2+4

ACT Practice #437

8)

Which of the following expressions is equivalent to $(2m-6)^2$ for all values of m?

(A) $4m^2-12$

(B) $4m^2-24$

(C) $4m^2-36$

(D) $4m^2-24x+36$

(E) $4m^2-12x+36$

ACT Practice #441

9)

What is the largest value of x that makes the equation $x^2 + 2x - 35 = 0$ true?

(A) 5

(B) 7

(C) 12

(D) 33

(E) 35

ACT Practice #445

GO COUGARS!

ASSIGNMENT
5.1

p. 241 #1-9 Identify a,b,c, 10-15
#44 - 47, and #50 (solve using elimination)