Algebra 1: Unit 7, lesson 2 Notes: Graphing Quadratic Functions: Standard Form Name:

Part 1: Revisit $f(x) = ax^2$

What do we know about "*a*"

How do we know if the parabola has a maximum or a minimum?

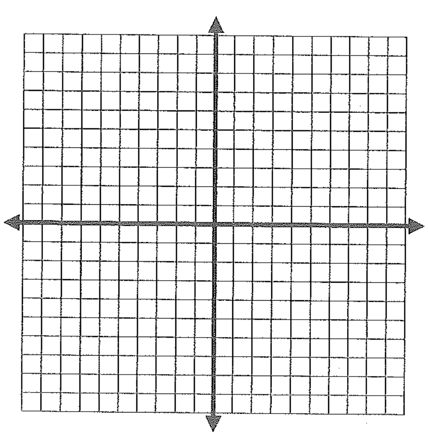
$$f(x) = ax^2 + bx + c$$

Where have you seen this function before?

Any ideas of what "*b*" and "*c*" might do to change the graph?

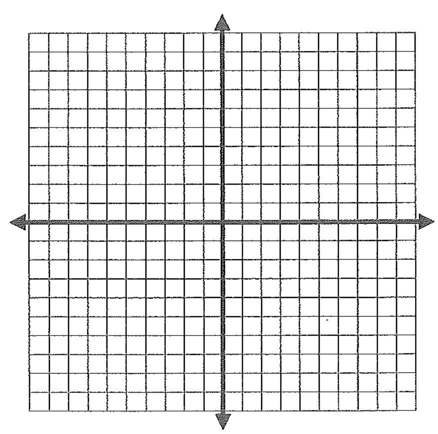
Let's look at a problem with only "*b*" and the shape of our parabola looking like shots from our Basketball Task. (*a* = ____)

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



Let's look at a problem with only "*c*" and the shape of our parabola looking like shots from our Basketball Task. (*a* = ____)

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



What findings do you see:

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Lets look more at *"c"*

x	-2	-1	0	1	–2
$f(x) = x^2 + 4x + 8$					

x	-2	-1	0	1	–2
$f(x) - x^2 - 6x - 7$					

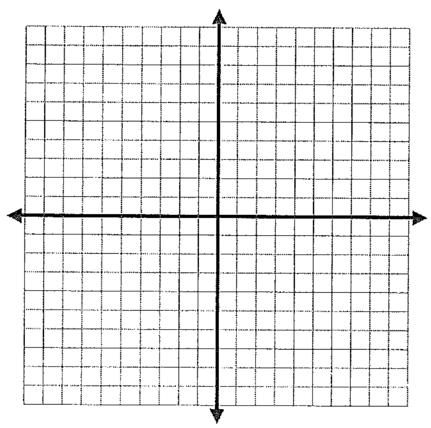
What does the *"c"* stand for:

Thinking back to our Basketball Task what might "c" be in those problems?

Basketball Task Day 2 Part 1 – see Task Handout and transparency graph paper

Part 2: Exploring the graph of a Quadratic Function in <u>Standard form</u>:

$f(x) = x^2 + 4x - 5$



Steps to find Parts of a Quadratic Function f(x) = ax² + bx + c:

1.

2.

3.

4.

5.

6.

Parts of a Quadratic Function:

x	y

Direction of opening:

Vertex:

Maximum/Minimum:

Axis of Symmetry:

y-intercept: x-intercept(s):

Domain:

Range:

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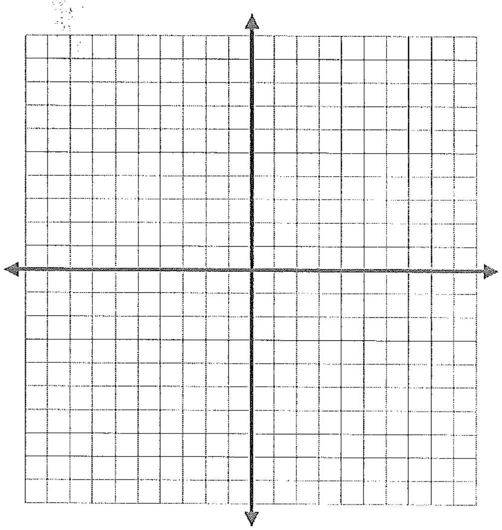
Examples: Find all the parts and graph the quadratic function in standard form.

Ex 1: $f(x) = -\frac{1}{2}x^2 + 2x + 6$

x	y



Parts of a Quadratic Function:

Direction of opening:

Vertex:

Maximum/Minimum:

Axis of Symmetry:

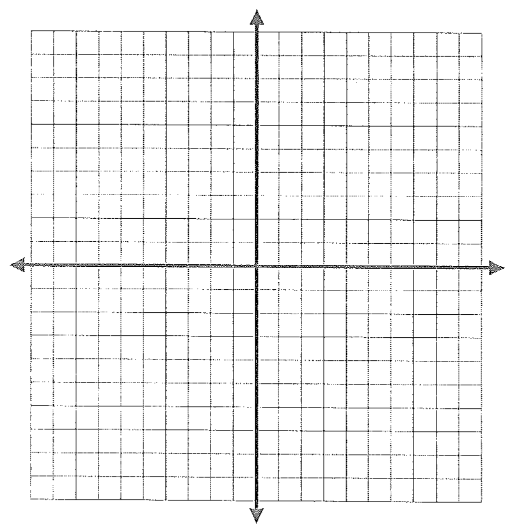
y-intercept: x-intercept(s):

Domain:

Range:

$f(x) = 3x^2 + 6x + 1$

x	y



Parts of a Quadratic Function:

Direction of opening:

Vertex:

Maximum/Minimum:

Axis of Symmetry:

y-intercept: x-intercept(s):

Domain:

Range:

Exploring the equation of a quadratic function in standard form.

Tim hits a softball. The function $h(x) = -14t^2 + 56t + 3$ describes the height (in feet) of the softball, and *t* is the time (in seconds).

a) Draw a rough graph of what this graph might look like.

b) Does the graph have a maximum or minimum? What is it? Explain in the context of the problem.

c) Evaluate *h*(0). What does this value tell you? Explain in the context of the problem.

d) How long is the ball in the air?

Ticket out the door:

In the last problem how would have the function changed had Tim hit a line drive that the 2nd baseman caught?