What you will learn about:
How to predict the shape of and location of graphs of quadratic functions

$y = ax^2 + bx + c$

$y = ax^2$

1. Study the tables and graphs produced by such functions for several combinations of positive and negative numbers.

Set 1	**Set 2**
$y = x^2$	$y = -x^2$
$y = 4x^2$	$y = -\frac{1}{2}x^2$
$y = \frac{1}{3}x^2$	$y = 3x^2$

a. Using Set 1 how is the graph of $y = ax^2$ compared to the graph of $y = x^2$. $a > 1$ → skinnier → Vertical Stretch

a between 0 + 1 → wider Vertical Compression
$0 < a < 1$

b. Using Set 2 how is the graph of $y = ax^2$ compared to the graph of $y = x^2$. $a > 0$ opens up

$a < 0$ opens Down

C. Explain the effects that the coefficient *a* has on the quadratic function $y = ax^2$.

$a > 0$ opens up

$a < 0$ opens down
Reflection over
x-axis

$|a| > 0$ Vertical Stretch

$0 < |a| < 1$ Vertical Compression

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<td>Adding a Constant</td>
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2. Study the tables and graphs produced by such functions for several combinations of positive and negative numbers

Set 1	**Set 2**	**Set 3**
$y = x^2$	$y = -x^2$	$y = 2x^2$
$y = x^2 + 3$	$y = -x^2 + 5$	$y = 2x^2 + 1$
$y = x^2 - 4$	$y = -x^2 - 1$	$y = 2x^2 - 3$

a. How is the graph of $y = ax^2 + c$ related to the graph of $y = ax^2$?

C-value y-intercept

b. How is the relationship between $y = ax^2 + c$ and $y = ax^2$ shown in the tables (x, y) values for the functions?

$y = ax^2 + c$ will always
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<td>Factored and Expanded Forms</td>
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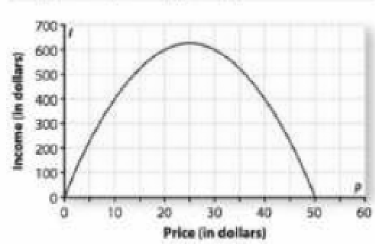
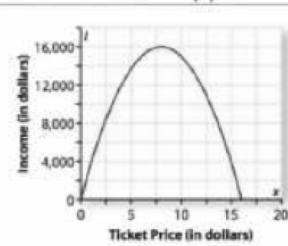
When you studied problems about income from an amusement park bungee jump and promotion of a concert, you looked at functions relating income to ticket price. The resulting income rules has similar forms:

Bungee Jump: $I = p(50 - p)$



Concert Promotion: $I = x(4{,}000 - 250x)$



Just as you did in early courses you can apply properties of numbers and operations to rewrite these rules in equivalent expanded form.
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