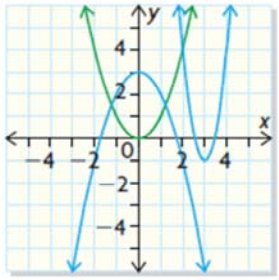
# Functions and Applications
## Chapter 1: Introduction to the Quadratic Function

1.4 Exploring Transformations of Quadratic Functions





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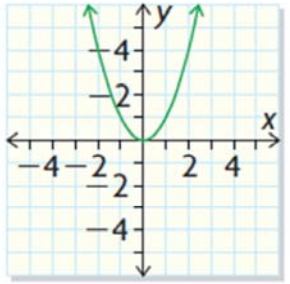
1.4 Exploring Transformations of Quadratic Functions

Quadratic Functions:
$F(x) = x^2$
- parabola that opens up
- vertex at the origin
- *y* has a minimum value
- *y*-axis is axis of symmetry
- graph only in quadrants 1 and 2




Domain:

Range: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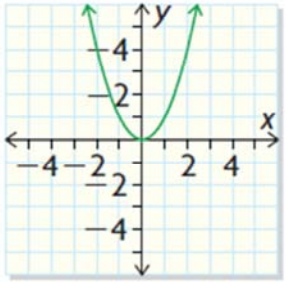
1.4 Exploring Transformations of Quadratic Functions
Quadratic Functions:

| X | Y |
|---|---|
| | |
| | |
| | |
| | |
| | |





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1.4 Exploring Transformations of Quadratic Functions

$f(x) = x^2+k$

| Function | Value of $k$ in $f(x) = x^2 + k$ | Direction of Opening | Vertex | Axis of Symmetry | Congruent to $f(x) = x^2$? |
|---|---|---|---|---|---|
| $f(x) = x^2$ | 0 | up | (0, 0) | $x = 0$ | yes |
| $f(x) = x^2 + 2$ | 2 | | | | |
| $f(x) = x^2 + 4$ | | | | | |
| $f(x) = x^2 - 1$ | | | | | |
| $f(x) = x^2 - 3$ | | | | | |

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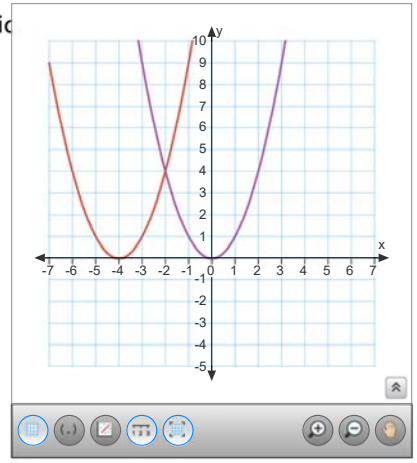
1.4 Exploring Transformatic

$f(x) = x^2+k$

$y = x^2$

$y = (x+4)^2$




# Functions and Applications
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1.4 Exploring Transformations of Quadratic Functions

$f(x) = x^2+k$

What effect does 'k' have on:

**a)** direction of opening

**b)** vertex

**c)** axis of symmetry

**d)** congruency to $f(x) = x^2$

**e)** *x*-coordinates and *y*-coordinates


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$f(x) = (x-h)^2$

| Function | Value of $h$ in $f(x) = (x - h)^2$ | Direction of Opening | Vertex | Axis of Symmetry | Congruent to $f(x) = x^2$? |
|---|---|---|---|---|---|
| $f(x) = x^2$ | 0 | up | (0, 0) | $x = 0$ | yes |
| $f(x) = (x - 2)^2$ | 2 | | | | |
| $f(x) = (x - 4)^2$ | | | | | |
| $f(x) = (x + 2)^2$ | | | | | |
| $f(x) = (x + 4)^2$ | | | | | |


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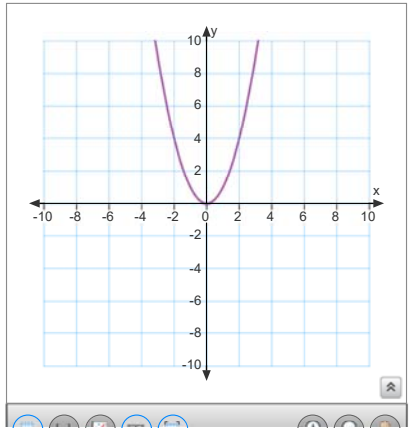
$f(x) = (x-h)^2$

$y = x^2$



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1.4 Exploring Transformations of Quadratic Functions

$f(x) = (x-h)^2$

What effect does 'h' have on:
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**b)** vertex
**c)** axis of symmetry
**d)** congruency to f(x) = $x^2$
**e)** *x*-coordinates and *y*-coordinates


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$f(x) = ax^2$

| Function | Value of *a* in $f(x) = ax^2$ | Direction of Opening | Vertex | Axis of Symmetry | Congruent to $f(x) = x^2$? |
|---|---|---|---|---|---|
| $f(x) = x^2$ | 1 | up | (0, 0) | $x = 0$ | yes |
| $f(x) = 2x^2$ | | | | | |
| $f(x) = 0.5x^2$ | | | | | |
| $f(x) = -2x^2$ | | | | | |
| $f(x) = -0.5x^2$ | | | | | |


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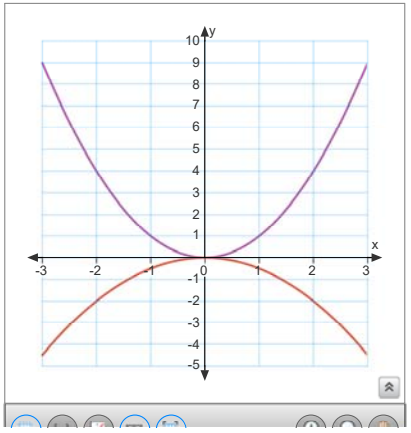
1.4 Exploring Transformations of Quadratic Functions

$f(x) = ax^2$

$y = x^2$

$y = -0.5x^2$





# Functions and Applications
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1.4 Exploring Transformations of Quadratic Functions

$f(x) = ax^2$

What effect does 'a' have on:
**a)** direction of opening
**b)** vertex
**c)** axis of symmetry
**d)** congruency to f(x) = $x^2$
**e)** *x*-coordinates and *y*-coordinates

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Homework:

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**Homework:**

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