

Quadratic Functions on the Graphing Calculator

Keys On The Graphing Calculator

- Y=** This is where you will enter the equation that you want to graph
- graph** This button will show any graphs that have been highlighted from **Y=**
- window** This button allows you to change the scales on your graph
- trace** This button places a cursor on your graph to locate certain points
- X,T,θ,n** This button enters your variable (usually x) into your equation to be graphed.
- ^** This button allows you to enter an exponent. For example x^2 can be entered as $x \wedge 2$

Graphing Quadratic Functions

Press **Y=** and clear any equations by highlighting the equation and then pressing **clear**
Enter the equation $y = x^2$. Select **window** and set xmin to -9.4 and xmax to 9.4.
Select **graph** to see the graph of $y = x^2$.

- Use the **trace** button to do the following.
 - Find the value of y when $x = 7$. _____
 - Find the value of y when $x = -0.2$ _____
 - Find the value of y when $x = -3.4$ _____
 - Describe how these values could have been found algebraically.

 - Find the value(s) of x when $y = 7.84$ _____
 - Find the value(s) of x when $y = 17.64$ _____
 - Describe how these values could have been found algebraically.

- Go back to the equation screen by selecting **Y=**. Enter the equation $y = x^2 + 4$.
Look at the graph by selecting **graph**.
How does this graph compare to the graph of $y = x^2$?

Predict how each of the following graphs will compare to the graph of $y = x^2$.

$$y = x^2 - 5$$

$$y = x^2 + 2$$

Graph each of these separately to check your prediction.

In general, given the graph of $y = x^2 + k$:

a) Describe the transformations that take place in comparison to $y = x^2$.

b) State the vertex. _____

c) State the axis of symmetry. _____

d) State the domain: _____

e) State the range: _____

3. Select and clear all equations except $y = x^2$. Now enter the equation $y = 3x^2$.
Look at the graph by selecting How does this graph compare to the graph of $y = x^2$?

Select and clear all equations except $y = x^2$. Now enter the equation $y = \frac{1}{3}x^2$.
Look at the graph by selecting How does this graph compare to the graph of $y = x^2$?

Select and clear all equations except $y = x^2$. Now enter the equation $y = -x^2$.
Look at the graph by selecting How does this graph compare to the graph of $y = x^2$?

Predict how each of the following graphs will compare to the graph of $y = x^2$.

$y = 4x^2$ _____

$y = \frac{1}{5}x^2$ _____

$y = -2x^2$ _____

Graph each of these separately to check your prediction.

In general, given the graph of $y = ax^2$:

a) Describe the transformations that take place in comparison to $y = x^2$

b) State the vertex. _____

c) State the axis of symmetry. _____

d) State the domain: _____

e) State the range: _____

4. Go back to the equation screen by selecting . Clear all equations except $y = x^2$.
Enter the equation $y = (x - 3)^2$.
Look at the graph by selecting How does this graph compare to the graph of $y = x^2$?

Predict how each of the following graphs will compare to the graph of $y = x^2$.

$y = (x + 5)^2$ _____

$y = (x - 6)^2$ _____

Graph each of these separately to check your prediction.

In general, given the graph of $y = (x - h)^2$:

- a) Describe the transformations that take place in comparison to $y = x^2$

- b) State the vertex. _____
 c) State the axis of symmetry. _____
 d) State the domain: _____
 e) State the range: _____

5. Given the equations of the following quadratic functions, predict the transformations that will occur, graph each on the calculator and then state the specific information about each.

| Equation | Predicted Transformations | Graph Information |
|-----------------------|---------------------------|--|
| $y = -(x - 2)^2$ | | vertex: axis of symmetry: max or min: range: direction of opening: zero(s): |
| $y = -2x^2 - 8$ | | vertex: axis of symmetry: max or min: range: direction of opening: zero(s): |
| $y = (x + 2)^2 - 9$ | | vertex: axis of symmetry: max or min: range: direction of opening: zero(s): |
| $y = -2(x - 1)^2 - 4$ | | vertex: axis of symmetry: max or min: range: direction of opening: zero(s): |
| $y = a(x - h)^2 + k$ | | vertex: axis of symmetry: max or min: range: direction of opening: zero(s): |