

Moving Parabolas Around

You may experiment on your calculator to help you answer these questions.

Review

- These questions are about the graph of $y=ax^2$ where $a \neq 0$.
 - What is the graph called?
 - Where are its x- and y-intercepts?
 - Where is its vertex?
 - What determines whether it is a smile or a frown?
 - How does changing a change the shape of the graph?
- These questions are about the graph of $y=a(x-p)(x-q)$ where $a \neq 0$.
 - What is this form of a quadratic function called?
 - Where are the x- and y-intercepts?
(Hint: answer in terms of a , p , q .)
 - How does one find the vertex?
 - What determines whether the parabola is a smile or a frown?
 - How does changing a change the shape of the graph?

Moving Left and Right

- What does the graph look like if $p=q$?
- Find the equation of a parabola whose vertex is at:
 - $(3, 0)$ a smile, then a frown
 - $(-2, 0)$
 - $(h, 0)$. Explain.

Moving Up and Down

- These questions are about the graph of the function $y=ax^2+c$
 - Where is its vertex?
 - How is it related to the graph of $y=ax^2$?

- Find the equation of a parabola whose vertex is at:
 - $(0, -3)$ a smile, then a frown
 - $(0, 2)$
 - $(0, v)$. Explain.

Moving Anywhere

- Find the equation of a parabola whose vertex is at:
 - $(3, -2)$ a smile, then a frown
 - $(-2, 3)$
 - (h, v) . Explain.
- Tell where the vertex of these parabolas is just by looking at the formulas. Be careful about plus and minus.
 - $y=(x-4)^2$
 - $y=x^2+5$
 - $y=(x-4)^2+5$
 - $y=(x-4)^2-5$
 - $y=(x+4)^2+5$
 - $y=(x+4)^2-5$
 - $y=.5(x+4)^2-5$
 - $y=-.5(x+4)^2-5$
- Using the format of the previous problem, write the equations of five different-shaped parabolas each with vertex at $(1, 2)$. How do you change the shape and the orientation?
- This is called *vertex form*:

$$y=a(x-h)^2+v$$
 - Where is the vertex for this parabola?
 - What does a do?
 - What does h do?
 - What does v do?