10.2: Graph $y = ax^2 + bx + c$

Goals: *Find axis of symmetry
*Find the vertex
*Graph a quadratic function by finding the axis of symmetry and vertex

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Properties of Graphs of Quadratic Functions:

· If $a > 0$ then

$a < 0$ then

· If $|a| > 1$ then

$|a| < 1$ then

· To find the axis of symmetry use:

· The vertex always occurs:
· so to find the vertex:

· y-intercept:

For each quadratic function, find the axis of symmetry and the vertex. State whether the vertex is a minimum or maximum point.

Ex: $y = x^2 - 2x - 3$

Ex: $y = 3x^2 + 12x - 1$

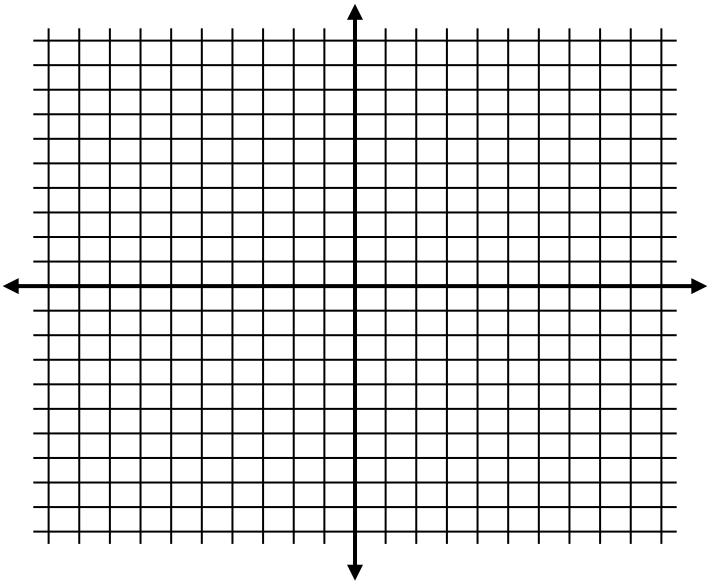
For each quadratic function find the maximum or minimum value. State which it is.

Ex: $y = -3x^2 - 12x + 10$

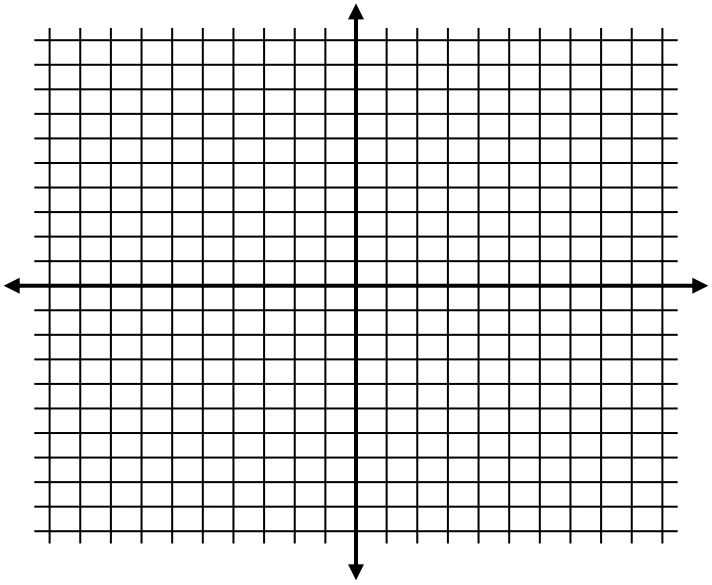
Ex: $f(x) = 2x^2 - 16x + 4$

Graph. First find the vertex then choose 2 – 3 point around the vertex to complete the graph. Use your knowledge of characteristics of parabolas to ensure your final graph makes sense.

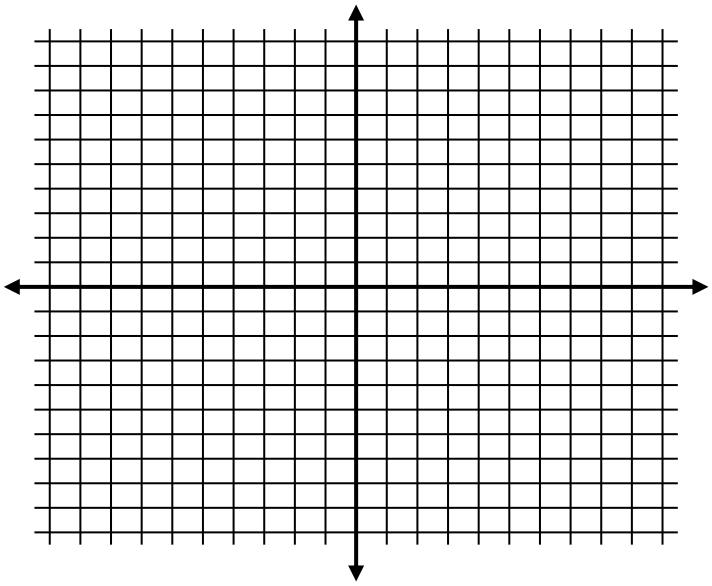
Ex: $y = -2x^2 + 12x - 7$



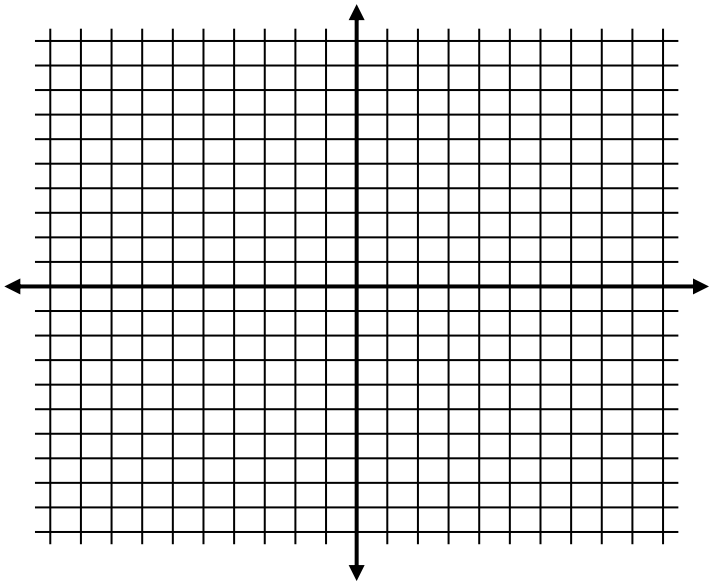
Ex: $y = 3x^2 - 6x + 2$



Ex: $y = 3x^2 + 12x - 8$



Ex: $y = 2x^2 - 8x + 7$



Ex: The suspension cables between two towers of the Mackinac Bridge in Michigan form a parabola that can be modeled by the graph of $y = 0.000097x^2 - 0.37x + 549$ where x and y are measured in feet. What is the height of the cable at the lowest point?

Ex: The cables between two telephone poles can be modeled by the equation $y = 0.0024x^2 - 0.1x + 24$, where x and y are measured in feet. To the nearest foot, what is the height of the cable above the ground at its lowest point?

Ex: The cables between the two towers of the Tacoma Narrows bridge form a parabola that can be modeled by the equation $y = 0.00014x^2 - 0.4x + 507$ where x and y are measured in feet. What is the height of the cable above the water at its lowest point? Round your answer to the nearest foot.