

Steps for Graphing Quadratic Equations

Step #1: Find the factored form of the quadratic equation.

Example 1: $y = (x + 3)(x + 5)$	Example 2: $y = x(x + 6)$
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Step #2: Find the expanded form of the quadratic equation.

Example 1: $y = x^2 + 8x + 15$	Example 2: $y = x^2 + 6x$
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Step #3: Find the y-intercept by looking at the "c" term in the expanded form of the equation.

Example 1: $c = 15$ $(0, 15)$	Example 2: $c = 0$ $(0, 0)$
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Step #4: Determine if the parabola opens up or down by looking at the "a" term in the expanded form of the equation. If "a" is positive, the parabola opens up. If "a" is negative, the parabola opens down.

Example 1: $a = 1$ opens UP	Example 2: $a = 1$ opens UP
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Step #5: Use the factored form of the equation to find the x-intercepts by setting the equation equal to 0 and solving for x.

<p>Example 1:</p> $(x + 3)(x + 5) = 0$ $x + 3 = 0 \qquad x + 5 = 0$ $x = -3 \qquad x = -5$ $(-3, 0) \qquad (-5, 0)$	<p>Example 2:</p> $x(x + 6) = 0$ $x = 0 \qquad x + 6 = 0$ $(0, 0) \qquad x = -6$ $\qquad (-6, 0)$
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Step #6: Determine the line of symmetry by finding the midpoint between the x-intercepts.

<p>Example 1:</p> <p>Because the midpoint between -3 and -5 is -4, the equation for the line of symmetry is:</p> $x = -4$	<p>Example 2:</p> <p>Because the midpoint between 0 and -6 is -3, the equation for the line of symmetry is:</p> $x = -3$
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Step #7: Find the minimum or maximum point by plugging in the x value for the line of symmetry into the equation (either factored form or expanded form) and solving for y. If the parabola opens up, there is a minimum point. If the parabola opens down, there is a maximum point.

<p>Example 1:</p> $y = (-4 + 3)(-4 + 5)$ $y = (-1)(1) = -1$ <p>min point: $(-4, -1)$</p>	<p>Example 2:</p> $y = (-3)^2 + 6(-3)$ $y = 9 - 18 = -9$ <p>min point: $(-3, -9)$</p>
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