

Example 2 - Vertex Formula

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a) $y = 2x^2 + 4x$

1. we get the a, b, c in the formula $y = ax^2 + bx + c$

- $a = 2$

- $b = 4$

- $c = 0$

2. then we plug in a, b into the formula

- $x = -b / (2a)$

- $x = -4 / (2 \cdot 2) = -4/4 = -1$

- so the axis of symmetry is $x = -1$

- to find the vertex

- so the known vertex data is $(-1, y)$

- to find y for the vertex we need to plug -1 into the formula $y = 2x^2 + 4x$

- $y = 2 \cdot (-1)^2 + 4 \cdot (-1) = -6$

- so the vertex is (-1, -6)

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B) $y = -x^2 + 4x - 5$

1. we get the a, b, c in the formula $y = ax^2 + bx + c$

- $a = -1$

- $b = 4$

- $c = -5$

2. then we plug in a, b into the formula

- $x = -b / (2a)$

- $x = -4 / (2 \cdot -1) = -4 / -2 = 2$

- so the axis of symmetry is $x = 2$

- to find the vertex

- so the known vertex data is (2, y)

- to find y for the vertex we need to plug -1 into the formula $y = 2x^2 + 4x$

- $y = -2^2 + 4 \cdot 2 - 5 = -1$

- so the vertex is (2, -1)

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