Solving Equations by Completing the Square

<u>Standard Form</u>

$y = ax^2 + bx + c$

<u>Vertex Form</u>

$y = a(x-h)^2 + k$

Step 1: Write the *x* terms on the left side of the equation and the constant on the right side of the equation.
Step 2: Divide *b* by 2 and then square it. Add this number to both sides of the equation.
Step 3: Write in vertex form.

1. Solve each equation by completing the square.

a) $x^2 - 6x - 40 = 0$

b) $x^2 + 4x + 3 = 0$

c) $x^2 + 3x = 18$

d) $x^2 + 4x = 1$

e) $x^2 + 2x = 5$

2. Rewrite each quadratic function in vertex form.

$$y = a\left(x - h\right)^2 + k$$

a) $y = x^2 - 4x + 8$

b) $y = -3 + 2x + x^2$

c) $4y = 4x^2 + 20x - 4$

d) $y = x^2 + \frac{1}{4}x - 3$