# L6 Completing the Square

Tuesday, September 20, 2022 8:45 AM



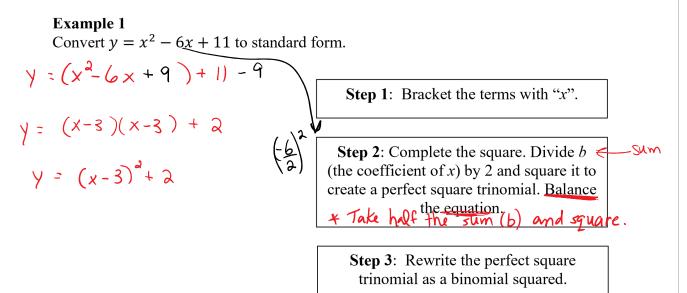
L6 Completing the Square

# Lesson 6 Converting to Standard Form - Completing the Square

Recall:

General form 
$$y = ax^2 + bx + c$$
  
Standard form  $y = a(x-h)^2 + k$ 
 $(x+5)(x+5)$ 
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When the equation of a quadratic function is in general form, most characteristics of the graph cannot be identified. Therefore it is useful to convert from general form to standard form by *completing the square*.



**Example 2** Convert  $y = x^2 - 4x + 10$  to standard form.

$$\gamma = (x^{2} - 4x + 4) + 10 - 4$$
  
 $\gamma = (x - 2)^{2} + 6$ 

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#### Example 3

Convert  $y = 2x^2 - 8x - 7$  to standard form.

$$\gamma = 2(x^{2}-4x+4) - 7-8$$
  
 $\gamma = 2(x-2)^{2} - 15$ 

Step 1: Bracket the terms with "x" and factor out the numerical coefficient " $a^{t}$  value (include the sign)

**Step 2**: Complete the square. Divide b (the coefficient of x) by 2 and square it to create a perfect square trinomial.

Step 3: Balance the equation (multiply the number added in step 2 by the coefficient)

**Step 4**: Rewrite the perfect square trinomial as a binomial squared.

 $\gamma - \frac{9}{2} = -\frac{1}{2} (x^{2} + 6x + q)$ 

### **Example 4**

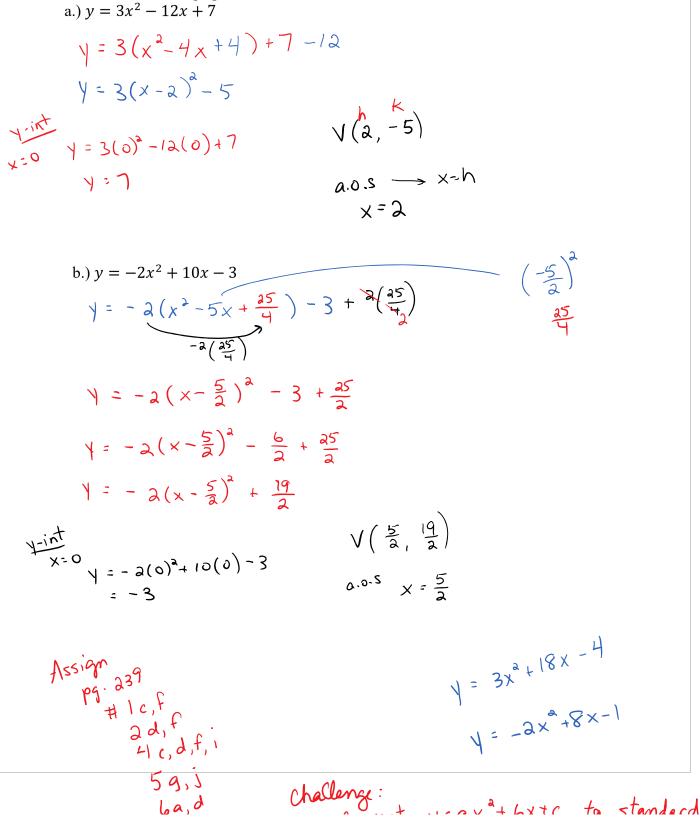
Write in standard form:  $y = -\frac{1}{2}x^2 - 3x + 5$ 

 $Y = -\frac{1}{a} (x^{2} + 6x + 9) + 5 + \frac{9}{a}$  $-\frac{9}{a}$  $Y = -\frac{1}{a} (x + 3)^{2} + \frac{10}{a} + \frac{9}{a}$  $Y = -\frac{1}{a} (x + 3)^{2} + \frac{19}{a}$ 

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## Example 5

Identify the intercepts, the equation of the axis of symmetry, and the coordinates of the vertex of the graph of



La.d

59,5 6a,d challenge: Convert y=ax<sup>a</sup>+bx+c to standard form.