**Unit 3- Quadractics Functions and Equations\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Lesson 3.3 Completing the Square (i.e standard to vertex form)**

Specific Outcome **2.**  Analyze quadratic functions of the form *y*=*ax*2+*bx*+*c* to identify characteristics of the corresponding graph, including:

• vertex

• domain and range

• direction of opening

• axis of symmetry

• *x*- and *y*-intercepts

and to solve problems.

**Example 1:Convert From Standard Form to Vertex Form**

Rewrite each function in vertex form by completing the square.

1. *f* (*x*) = *x*2 + 6*x* + 5

*Method One: Using Algebra Tiles*

1. *f* (*x*) = 3*x*2 – 12*x* – 9

**Method 2: Use an Algebraic Method**

To complete the square when the leading coefficient, *a*, is not 1,

• group the first \_\_\_\_\_\_\_\_\_ terms and factor out the leading coefficient

• inside the brackets, \_\_\_\_\_\_\_\_\_\_\_ **and** \_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the coefficient of the *x*-term

• \_\_\_\_\_\_\_\_\_\_\_ the perfect square trinomial

• rewrite the perfect square trinomial as the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

• expand the square brackets and simplify

1. *f* (*x*) = –5*x*2 – 70*x*

Example 1: Your Turn

Rewrite each function in vertex form by completing the square.

**a)** *y* = *x*2 + 8*x –* 7 **b)** *y* = 2*x*2 *–* 20*x* **c)** *y* = *–*3*x*2 *–* 18*x –* 24

**Example 2: Convert to Vertex Form and Verify**

**a)** Convert the function *y* = 4*x*2 – 28*x –* 23 to vertex form.

**b)** Verify that the two forms are equivalent.

**Example 2: Your Turn**

**a)** Convert the function *y* = –3*x*2 – 27*x* + 13 to vertex form.

**b)** Verify that the two forms are equivalent.

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