Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_

Algebra 1 PTech

**Completing the Square**

**Leading Coefficient a = 1**

**Part 2 Notes**

|  |  |
| --- | --- |
| **Standard Form of a Quadratic** | **Vertex Form of a Quadratic** |
|  |  |

Use the algorithm to write the equation of the following quadratic in vertex form.

 y = x2 – 8x + 7

|  |  |  |
| --- | --- | --- |
| **Step** | **Algorithm** | **Example** |
| 1 | Evaluate $\left(\frac{b}{2}\right)^{2}$ |  |
| 2 | Add and subtract the value from step 1 |  |
| 3 | Use the Associative Property to group together the perfect square |  |
| 4 | Factor the perfect square trinomial and combine like terms |  |
| 5 | Identify the vertex, if necessary. |  |

Examples:

 Write each of the following quadratics in vertex form using completing the square method. Identify the vertex of each.

a) y = x2 – 4x – 18 b) y = x2 + 8x + 15 c) y = x2 – 7x + 9

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_

Algebra 1 PTech

**Completing the Square**

**Leading Coefficient a = 1**

**Part 2 CW**

Write each of the following quadratics in vertex form using completing the square method. Identify the vertex of each.

1. y = x2 + 16x + 71 2. y = x2 – 2x – 5

3. y = x2 + 4x 4. y = x2 - 6x + 5

5. y = x2 – 12x + 23 6. y = x2 + 14x – 15

7. y = x2 + 5x – 3 8. y = x2 – 11x – 8

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_

Algebra 1 PTech

**Completing the Square**

**Leading Coefficient a ≠ 1**

**Notes**

When given a quadratic in standard form, it is likely that the leading coefficient will not equal 1. What should we do? We have to modify our algorithm!

Here we go…

Example 1:

 Write the following in vertex form using completing the square:

 y = 2x2 + 12x + 16

|  |  |  |
| --- | --- | --- |
| **Step** | **Algorithm** | **Example** |
| 1 | Use the Associative Property to group the first two terms together. Be sure to leave space and write the constant value outside the ( ). |  |
| 2 | Factor out the leading coefficient (a) from the two terms. |  |
| 3 | Evaluate $\left(\frac{b}{2}\right)^{2}$ |  |
| 4 | Add this value inside the ( ). Multiply it by the value from step 2 and subtract it outside the ( ). |  |
| 5 | Factor the perfect square trinomial and combine like terms.  |  |
| 6 | Identify the vertex, if necessary. |  |

Example 2:

 Write the following in vertex form using completing the square:

 y = 3x2 + 12x + 9

Example 3:

 Write the following in vertex form using completing the square. Identify the vertex of the quadratic.

 y = -2x2 + 8x – 7

Example 4:

Write the following in vertex form using completing the square. Identify the vertex of the quadratic.

 y = -3x2 + 18x + 9

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_

Algebra 1 PTech

**Completing the Square**

**Leading Coefficient a ≠ 1**

**Class Work**

Write each of the following quadratics in vertex form using completing the square method. Identify the vertex of each.

1. y = 2x2 + 6x + 3 2. y = -x2 – 10x + 8