Name:_____ Date:_____

UNIT 10 **LESSON 7**

Do Now: Solve the following quadratic equation by **completing the square** $x^2 + 8x - 9 = 0$

$+9 \quad +9$

x	$+4$
x^2	$4x$
$4x$	$+16$

$=$ | 9 / 16 |

$\sqrt{(x+4)^2} = \pm\sqrt{25}$

$x + 4 = \pm 5$

$-4 \quad -4$

$x = -4 \pm 5$

$x = -4 + 5 \quad x = -4 - 5$

$x = 1 \quad x = -9$

AIM: QUADRATIC EQUATION IN VERTEX FORM- DAY 1

Directions: Write each quadratic equation in vertex form by completing the square. Then, identify the quadratic equation's turning point.

1) $y = x^2 - 8x + 11$

x	-4
x^2	$-4x$
$-4x$	$+16$

$=$ | -11 / $+16$ |

$(x-4)^2 = 5$

$-5 \quad -5$

$y = (x-4)^2 - 5$

h, k

vertex $(4, -5)$

Step 1: Move the constant ("c" value) to the right side.

Step 2: Take half of the "b" value and square it and add it to BOTH sides.

Step 3: Make the left side a perfect square trinomial.

Step 4: Factor the perfect square trinomial and simplify the right side.

Step 5: Solve for y

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

Step 6: Identify the turning point (h,k)

Step 7: Check the vertex in the calculator.

2) $f(x) = x^2 + 6x - 2$

$y = x^2 + 6x - 2$

$+2 \qquad +2$

$y + 2 + 9 = x^2 + 6x + 9$

$\left(\frac{b}{2}\right)^2$

$\left(\frac{6}{2}\right)^2 = 9$

$y + 11 = (x+3)^2$

$-11 \qquad -11$

$y = (x+3)^2 - 11$

h, k

vertex: $(-3, -11)$

3) $h(x) = x^2 - 2x + 11$

$-11 \qquad -11$

	x	-1
x	x^2	$-1x$
-1	$-1x$	1

$=$

-11
$+1$

$(x-1)^2 = -10$

$+10 \qquad +10$

$h(x) = (x-1)^2 + 10$

h, k

vertex: $(1, 10)$

4) $f(x) = x^2 + 8x$

$\left(\frac{8}{2}\right)^2 = 16$

$f(x) + 16 = x^2 + 8x + 16$

$f(x) + 16 = (x+4)^2$

$-16 \qquad -16$

$f(x) = (x+4)^2 - 16$

vertex: $(\overset{h}{-4}, \overset{k}{-16})$