Name:_____ Date:_____

UNIT 8 **LESSON 6**

DO NOW:

a) Create a perfect square trinomial and factor it: $x^2+10x+25$ $(x+5)^2$	b) Create a perfect square trinomial and factor it: $x^2-10x+25$ $(x-5)^2$
c) Solve for the roots $\sqrt{x^2}=\sqrt{36}$ $x=\pm 6$	d) Solve for x-intercepts $x^2+6x-16=0$ $(x+8)(x-2)=0$ $x=-8 \mid x=2$ $\{-8,2\}$

AIM: COMPLETING THE SQUARE (a = 1)

1. Let's solve $x^2+6x-16=0$ another way!!

b-value: $\frac{6}{2}=(3)^2=9$

$+16 \quad +16$

$x^2+6x=16$

$x^2+6x+\underline{9}=16+\underline{9}$

$(x+3)(x+3)=25$

$\sqrt{(x+3)^2}=\sqrt{25}$

$x+3=\pm 5$

$x+3=5$ $\quad -3 \quad -3$

$x=2$

$x+3=-5$ $\quad -3 \quad -3$

$x=-8$

$\{2,-8\}$

Completing the Square is used when: when you can not factor the quadratic equation

2. Solve for the roots in simplest radical form: $x^2+8x-4=0$

1) Move the constant ("c" value) to the right side. (The "a" value must be equal to 1!)
2) Make the left side a perfect square trinomial: Take half of the "b" value.
3) Square it.
4) Add it to BOTH sides.
5) Factor the perfect square trinomial and simplify right side.
6) Take the square root of both sides and solve! (Remember positive and negative results!!!!)

b-value:

$\frac{8}{2}=(4)^2=16$

$x^2+8x=4$ $\quad +4+4$

$x^2+8x+16=4+16$

$(x+4)(x+4)=20$

$\sqrt{(x+4)^2}=\sqrt{20}$

$x+4=\sqrt{4}\ \sqrt{5}$

$x+4=\pm 2\sqrt{5}$

$x+4=2\sqrt{5}$ $\quad -4\ \ -4$

$x=-4+2\sqrt{5}$

$x+4=-2\sqrt{5}$ $\quad -4\ \ -4$

$x=-4-2\sqrt{5}$

$\{-4\pm 2\sqrt{5}\}$

3. Find the zeros of the function in simplest radical form: $x^2+20x=-40$

b-value:

$\frac{20}{2}=(10)^2=100$

$x^2+20x+100=-40+100$

$(x+10)(x+10)=60$

$\sqrt{(x+10)^2}=\sqrt{60}$

$x+10=\pm\sqrt{4}\ \sqrt{5}$

$x+10=\pm 2\sqrt{5}$

-10

$x=-10\pm 2\sqrt{5}$

$\{-10\pm 2\sqrt{5}\}$

4. Find the solution set by completing the square: $x^2 - 6x = 18$

1. Move the constant ("c" value) to the right side. (The "a" value must be equal to 1!)
2. Make the left side a perfect square trinomial: Take half of the "b" value.
3. Square it.
4. Add it to BOTH sides.
5. Factor the perfect square trinomial and simplify right side.
6. Take the square root of both sides and solve! (Remember positive and negative results!!!!)

b-value:

$\frac{-6}{2} = (-3)^2 = 9$

$x^2 - 6x + 9 = 18 + 9$

$(x-3)(x-3) = 27$

$(x-3)^2 = 27$

$\sqrt{x-3} = \pm\sqrt{27}$

$x - 3 = \pm\sqrt{9}\sqrt{3}$

$x - 3 = \pm 3\sqrt{3}$

$+3 \quad +3$

$x = 3 \pm 3\sqrt{3}$

5. Solve for the roots by completing the square in simplest radical form: $x^2 - 4x = 1$

b-value:

$\frac{-4}{2} = (-2)^2 = 4$

$x^2 - 4x + 4 = 1 + 4$

$(x-2)(x-2) = 5$

$\sqrt{(x-2)^2} = \sqrt{5}$

$x - 2 = \pm\sqrt{5}$

$+2 \quad +2$

$x = 2 \pm \sqrt{5}$

$\{2 \pm \sqrt{5}\}$