Name:_____ Date:_____

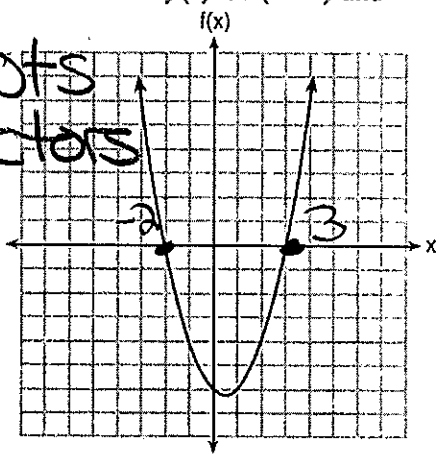
UNIT 8 **LESSON 7**

DO NOW: The graph of the function $f(x) = ax^2 + bx + c$ is given below. Could the factors of $f(x)$ be $(x + 2)$ and $(x - 3)$? Based on the graph, explain why or why *not*.

Yes! If the zero's/roots are -2 & 3, then the factors are $(x+2)$ & $(x-3)$

$(x+2)(x-3) = 0$

$x = -2 \mid x = 3$



AIM: COMPLETING THE SQUARE (a = 1) (Day 2)

1. Find the exact roots of $x^2 + 10x - 8 = 0$ by completing the square.

b-value: $\frac{10}{2} = (5)^2 = 25$

$+8 \quad +8$

$x^2 + 10x = 8$

$x^2 + 10x + 25 = 8 + 25$

$(x+5)(x+5) = 33$

$\sqrt{(x+5)^2} = \sqrt{33}$

$x + 5 = \pm\sqrt{33}$

$-5 \quad -5$

$x = -5 \pm \sqrt{33}$

$-5 + \sqrt{33} = .74$

$-5 - \sqrt{33} = -10.74$

Simplest radical form $-5 \pm \sqrt{33}$

Decimal form $-10.74, .74$

2. Solve the equation $x^2 - 6x = 15$ by completing the square.

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

$x^2 - 6x + 9 = 15 + 9$

$(x-3)(x-3) = 24$

$\sqrt{(x-3)^2} = \pm\sqrt{24}$

$x - 3 = \pm\sqrt{4}\sqrt{6}$

$x - 3 = \pm 2\sqrt{6}$

$+3 \quad +3$

$x = 3 \pm 2\sqrt{6}$

$3 + 2\sqrt{6} = 7.9$

$3 - 2\sqrt{6} = -1.9$

Simplest radical form $3 \pm 2\sqrt{6}$

Decimal form $-1.9, 7.9$

3. Which step can be used when solving $x^2 - 6x - 25 = 0$ by completing the square?

1) $x^2 - 6x + 9 = 25 + 9$
2) $x^2 - 6x - 9 = 25 - 9$
3) $x^2 - 6x + 36 = 25 + 36$
4) $x^2 - 6x - 36 = 25 - 36$

$+25$

$x^2 - 6x = 25$

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

$x^2 - 6x + 9 = 25 + 9$

4. When solving the equation $x^2 - 8x - 7 = 0$ by completing the square, which equation is a step in the process?

1) $(x-4)^2 = 9$
2) $(x-4)^2 = 23$
3) $(x-8)^2 = 9$
4) $(x-8)^2 = 23$

$+7 \quad +7$

$x^2 - 8x = 7$

$x^2 - 8x + 16 = 7 + 16$

$(x-4)^2 = 23$

5. If $x^2 + 2 = 6x$ is solved by completing the square, an intermediate step would be

1) $(x+3)^2 = 7$
2) $(x-3)^2 = 7$
3) $(x-3)^2 = 11$
4) $(x-6)^2 = 34$

b-value:

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

$x^2 + 2 = 6x$

$-6x \quad -6x$

$x^2 - 6x + 2 = 0$

$-2 \quad -2$

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

$(x-3)(x-3) = 7$

$(x-3)^2 = 7$

6. If $x^2 = 12x - 7$ is solved by completing the square, one of the steps in the process is

1) $(x-6)^2 = -43$
2) $(x+6)^2 = -43$
3) $(x-6)^2 = 29$
4) $(x+6)^2 = 29$

b-value:

$\frac{-12}{2} = (-6)^2 = 36$

$x^2 = 12x - 7$

$-12x \quad -12x$

$x^2 - 12x = -7$

$x^2 - 12x + 36 = -7 + 36$

$(x-6)(x-6) = 29$

$(x-6)^2 = 29$

7. Find the exact roots of $x^2 - 4x - 9 = 0$ by completing the square.

b-value:

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

$+9 \quad +9$

$x^2 - 4x = 9$

$x^2 - 4x + \underline{4} = 9 + \underline{4}$

$(x-2)(x-2) = 13$

$\sqrt{(x-2)^2} = \pm\sqrt{13}$

$x - 2 = \pm\sqrt{13}$

$+2 \quad +2$

$x = 2 \pm \sqrt{13}$

$2 + \sqrt{13} = 5.61$

$2 - \sqrt{13} = -1.61$

Simplest radical form $2 \pm \sqrt{13}$

Decimal form $-1.61, 5.61$