Warm-Up:

1) Write the equation of the line in slope-intercept form that passes through the points (1, 3) and (-5, 9). $\boxed{y - y_1 = m(x - x_1)}$

$m = -1$ $\frac{\Delta y}{\Delta x}$

$y - 3 = -1(x - 1)$

$y - 3 = -x + 1$

$y = -x + 4$

2) $(2x^3y^{-5}z)^{-4}(3x^{-2}y^4)^{-3}$

$$\frac{1}{(2x^3y^{-5}z)^4(3x^{-2}y^4)^3} = \frac{1}{2^4x^{12}y^{-20}z^4 3^3x^{-6}y^{12}} = \frac{1}{16x^6y^{-8}z^4 27} = \frac{y^8}{432x^6z^4}$$

Factor by grouping:

3) $3x^3 - 12x^2 + 5x - 20$

$3x^2(x-4) + 5(x-4)$

$(3x^2+5)(x-4)$

4) $16ab - 20a^3 + 4b - 5a^2$

$4a(4b - 5a^2) + 1(4b - 5a^2)$

$(4b - 5a^2)(4a + 1)$

In a perfect square trinomial, there is a relationship between the coefficient of the x-term (b) and the constant term (c).

$ax^2 + bx + c$

$x^2 + 8x + 16$ $x^2 - 12x + 36$

If we divide each x-term by two, then square the result we get the constant term.

Completing the Square: is the process of writing a quadratic equation so that one side is a perfect square trinomial.

1) Complete the square to form a perfect-square trinomial.

a. $x^2 + 2x +$ 1 $\frac{2}{2} = 1$ $1^2 = 1$

b. $x^2 - 6x +$ 9 $\frac{6}{2} = 3$ $3^2 = 9$

c. $x^2 + 5x +$ $\frac{25}{4}$ $\frac{5}{2}$ $\left(\frac{5}{2}\right)^2 = \frac{25}{4}$

Completing the $\square$

WHY?

This method allows us to use the square root method to solve quadratics that cannot be rewritten as $ax^2 = c$

HOW?

Rearrange your equation so it looks like:

$$ax^2 + bx + \square = c + \square$$

* If $a \neq 1$, divide every term by a.

In the squares, write $\left(\frac{b}{2}\right)^2$.

Now, you can rewrite the left side as $\left(x \pm \frac{b}{2}\right)^2$.

Take the square root of each side. Don't forget the $\pm$.

Solve for x.

EXAMPLE: Solve by completing the square.

$$2x^2 - 24x + 10 = 0$$
$$-10 \quad -10$$

$$\frac{2x^2}{2} - \frac{24x}{2} + \square = \frac{-10}{2} + \square$$

$$x^2 - 12x + \boxed{36} = -5 + \boxed{36}$$

$$(x-6)^2 = 31$$

$$x - 6 = \pm\sqrt{31}$$

$$x = 6 \pm \sqrt{31}$$

$\frac{b}{2} = \left(\frac{12}{2}\right) = 6$

$\left(\frac{b}{2}\right)^2 = 6^2 = 36$

3) Solve by completing the square: $x^2 - 4x - 45 = 0$

Step 1: $ax^2 + bx = c$ $\quad x^2 - 4x + \square = 45 + \square$

Step 2: b/2 $\quad \frac{4}{2} = 2$

Step 3: $(b/2)^2$ $\quad \left(\frac{4}{2}\right)^2 = 4$

Step 4: add $(b/2)^2$ $\quad x^2 - 4x + 4 = 45 + 4$

$x^2 - 4x + 4 = 49$

Step 5: factor $\quad \sqrt{(x-2)^2} = \sqrt{49}$

Step 6: Solve $\quad x - 2 = \pm\sqrt{49}$

$x - 2 = \pm 7$

$x = 2 \pm 7$

$x = 9, -5$

2) Solve by completing the square: $x^2 + 8x = 1$

Step 1: $ax^2 + bx = c$

Step 2: b/2 $\quad \frac{8}{2} = 4$

Step 3: $(b/2)^2$ $\quad (4)^2 = 16$

Step 4: add $(b/2)^2$ $\quad x^2 + 8x + 16 = 1 + 16$

Step 5: factor $\quad (x+4)^2 = 17$

$x + 4 = \pm\sqrt{17}$

Step 6: Solve $\quad x = -4 \pm \sqrt{17}$

Find my mistake:

Solve by completing the square: $x^2 + 4x = 12$

$b=4$

$4/2=2,\ 2^2=4$

$x^2+4x=12$

$x^2+4x+4=12+4$

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

$(x+2)(x+2)=16$

$(x+2)^2=16$

$(x+2)^2=16$

$\quad -2 \quad\ -2$

$x^2=14$

$\sqrt{x^2}=\sqrt{14}$

$x=\pm\sqrt{14}$

⑪ $x^2-10x-7=3$

$\quad +7 \quad +7$

$x^2-10x+\boxed{}=10+\boxed{}$