comparing: Solving **Linear** Equations
vs
Solving **Quadratic** Equations

$$a(x-r)(x-t)=0$$

QUADRATIC → $ax^2 + bx + c = 0$

LINEAR

Ex. Solve for x:
$$2(x+7) = 8$$

① Expand / Simplify
② Reverse Bedmas
    SAMDEB

$$2x + 14 = 8$$
$$2x = 8 - 14$$
$$\frac{2x}{2} = \frac{-6}{2}$$

$$\boxed{x = -3}$$

Ex. $x - 1 = 5x + 7$
    $-5x \quad -5x$

$$x - 5x - 1 = 7$$
$$-4x - 1 = 7$$
$$-4x = 7 + 1$$
$$\frac{-4x}{-4} = \frac{8}{-4}$$

$$\boxed{x = -2}$$

SAMDEB (isolate)

SAMDEB

$$\frac{2(x+7)^2}{2} = \frac{8}{2}$$

$$(x+7)^2 = 4$$

$$(x+7) = \pm\sqrt{4}$$

$$x + 7 = \pm 2$$

$$x + 7 = +2 \qquad x + 7 = -2$$
$$x = 2 - 7 \qquad x = -2 - 7$$
$$\boxed{x = -5} \qquad \boxed{x = -9}$$

Quadratic Formula

$$2(x+7)^2 = 8$$
$$2(x^2 + 14x + 49) = 8$$
$$2x^2 + 28x + 98 = 8$$
$$2x^2 + 28x + 98 - 8 = 0$$
$$2x^2 + 28x + 90 = 0$$

Quadratic formula: $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Ex. Solve: $\dfrac{2x^2 + 28x + 90}{2} = \dfrac{0}{2}$

$a = 1$
$b = 14$
$c = 45$

$$1x^2 + 14x + 45 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-14 \pm \sqrt{14^2 - 4(1)(45)}}{2(1)}$$

$$= \frac{-14 \pm \sqrt{16}}{2}$$

$$x = \frac{-14 \pm 4}{2}$$

$$x = \frac{-14 + 4}{2} \qquad x = \frac{-14 - 4}{2}$$

$$= \frac{-10}{2} \qquad x = \frac{-18}{2}$$

$$\boxed{x = -5} \qquad \boxed{x = -9}$$

Solve by FACTORING !!

A: 14
M: 45

Solve for x:

        A   M
                        9, 5
$$x^2 + 14x + 45 = 0$$

$$(x + 9)(x + 5) = 0$$

$$(x + 9) = 0 \qquad (x + 5) = 0$$

$$x + 9 = 0 \qquad x + 5 = 0$$
$$\boxed{x = -9} \qquad \boxed{x = -5}$$