

6. Complete the square

$$x^2 - 8x + 16 = 0$$

* x^2 must have coefficient of 1
* the # must be on the opp. side

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

↓

Take half $\frac{-8}{2} = -4$

square it $(-4)^2 = 16$

the factor ← add to both sides

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

$$(x-4)^2 = 2 \quad \leftarrow \text{take square root}$$

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

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

$$+4 \quad +4$$

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

$$x^2 - 10x - 24 = 0$$

$$x^2 - 10x = 24$$

$$x^2 - 10x + 25 = 24 + 25$$

$$\sqrt{(x-5)^2} = \sqrt{49}$$

$$x-5 = \pm 7$$

$$+5 \quad +5$$

$$x = 12 \text{ or } x = -2$$

$$\frac{-10}{2} = -5$$

$$2$$

$$(-5)^2 = 25$$

$$3x^2 + 14x = 25$$

$$\frac{3}{3} \quad \frac{14}{3} \quad \frac{25}{3}$$

$$x^2 + \frac{14}{3}x = \frac{25}{3}$$

$$x^2 + \frac{14}{3}x + \frac{49}{9} = \frac{25}{3} + \frac{49}{9}$$

$$\sqrt{\left(x + \frac{14}{6}\right)^2} = \sqrt{\frac{124}{9}}$$

$$x + \frac{14}{6} = \pm \sqrt{\frac{124}{9}}$$

$$-\frac{14}{6} \quad -\frac{14}{6}$$

$$x = \frac{-14}{6} \pm \sqrt{\frac{124}{9}}$$

$$\frac{14}{3} \div \frac{2}{1}$$

$$\frac{14}{3} \times \frac{1}{2} = \left(\frac{14}{6}\right)^2 = \frac{196}{36} = \frac{49}{9}$$