

4.2 Study Guide - Complete the Square - KEY

$$(1) \left(\frac{b}{a}\right)^2 = \left(\frac{12}{2}\right)^2 = 36 = c$$

$$(2) \left(\frac{b}{a}\right)^2 = \left(\frac{-18}{2}\right)^2 = 81 = c$$

$$(3) \left(\frac{b}{a}\right)^2 = \left(\frac{-40}{2}\right)^2 = 400$$

$$(4) x^2 - 10x + 6 = 0$$

$$x^2 - 10x + 25 = 6 + 25 \quad \left(\frac{-10}{2}\right)^2 = 25$$

$$\sqrt{(x-5)^2} = \sqrt{31}$$

$$x-5 = \pm\sqrt{31}$$

$$x = 5 \pm \sqrt{31}$$

$$(5) 2x^2 + 16x + 8 = 0$$

$$\frac{2x^2 + 16x}{2} = \frac{-8}{2}$$

$$x^2 + 8x + 16 = -4 + 16 \quad \left(\frac{8}{2}\right)^2 = 16$$

$$\sqrt{(x+4)^2} = \sqrt{12}$$

$$x+4 = \pm 2\sqrt{3}$$

$$x = -4 \pm 2\sqrt{3}$$

$$(6) 5x^2 - 10x + 30 = 0$$

$$\frac{5x^2 - 10x}{5} = \frac{-30}{5}$$

$$x^2 - 2x + 1 = -5 + 1 \quad \left(\frac{-2}{2}\right)^2 = 1$$

$$\sqrt{(x-1)^2} = \sqrt{-14}$$

$$x-1 = \pm i\sqrt{14}$$

$$x = 1 \pm i\sqrt{14}$$

$$(10) c = 4$$

$$(11) c = 1$$

$$(12) c = 81$$

$$(13) c = 144$$

$$(14) c = 49$$

$$(15) c = \frac{25}{4}$$

$$(16) c = \frac{1}{4}$$

$$(17) c = \frac{49}{4}$$

$$(18) x^2 - 2x + 1 = 2 + 1$$

$$\sqrt{(x-1)^2} = \sqrt{3}$$

$$x-1 = \pm\sqrt{3}$$

$$x = 1 \pm \sqrt{3}$$

$$(19) x^2 + 6x + 3 = 0$$

$$x^2 + 6x + 9 = -3 + 9$$

$$\sqrt{(x+3)^2} = \sqrt{6}$$

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

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

$$(20) x^2 + 8x - 2 = 0$$

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

$$\sqrt{(x+4)^2} = \sqrt{18}$$

$$x+4 = \pm 3\sqrt{2}$$

$$x = -4 \pm 3\sqrt{2}$$

$$(21) x^2 + 2x + 5 = 0$$

$$x^2 + 2x + 1 = -5 + 1$$

$$\sqrt{(x+1)^2} = \sqrt{-4}$$

$$x+1 = \pm 2i$$

$$x = -1 \pm 2i$$

$$(22) x^2 + 10x + 11 = 0$$

$$x^2 + 10x + 25 = -11 + 25$$

$$\sqrt{(x+5)^2} = \sqrt{14}$$

$$x+5 = \pm\sqrt{14}$$

$$x = -5 \pm \sqrt{14}$$

$$(23) x^2 - 14x + 10 = 0$$

$$x^2 - 14x + 49 = -10 + 49$$

$$\sqrt{(x-7)^2} = \sqrt{39}$$

$$x-7 = \pm\sqrt{39}$$

$$x = 7 \pm \sqrt{39}$$

$$(24) x^2 - x + 1 = 0$$

$$x^2 - x + \frac{1}{4} = -1 + \frac{1}{4}$$

$$\sqrt{\left(x - \frac{1}{2}\right)^2} = \sqrt{-\frac{3}{4}}$$

$$x - \frac{1}{2} = \pm i\frac{\sqrt{3}}{2}$$

$$x = \frac{1}{2} \pm i\frac{\sqrt{3}}{2}$$

$$\textcircled{25} \quad x^2 - x - 3 = 0$$

$$x^2 - x + \frac{1}{4} = 3 + \frac{1}{4}$$

$$\sqrt{(x - \frac{1}{2})^2} = \sqrt{\frac{13}{4}}$$

$$x - \frac{1}{2} = \pm \frac{\sqrt{13}}{2}$$

$$x = \frac{1}{2} \pm \frac{\sqrt{13}}{2}$$