

$$\begin{aligned}(x+4)^2 &= (x+4)(x+4) \\ &= x^2 + 4x + 4x + 16 \\ &= x^2 + 8x + 16\end{aligned}$$

$$\begin{aligned}(x-3)^2 &= (x-3)(x-3) \\ &= x^2 - 3x - 3x + 9 \\ &= x^2 - 6x + 9\end{aligned}$$

$$\begin{aligned}(x+a)^2 &= (x+a)(x+a) \\ &= x^2 + ax + ax + a^2 \\ &= x^2 + 2ax + a^2\end{aligned}$$

$$(x+a)^2 =$$

10.2 Solving Quadratic Equations by Completing the Square

p 791

EX:

$$x^2 + 6x + 7 = 0$$

$$x^2 + 6x + 3^2 = -7 + 9$$

$$(x+3)^2 = 2$$

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

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

$$x^2 - 8x + 5 = 0$$

$$x^2 - 8x + (-4)^2 = -5 + 16$$

$$(x-4)^2 = 11$$

$$x-4 = \pm \sqrt{11}$$

$$x = 4 \pm \sqrt{11}$$

$$x^2 + 6x + 8 = 0$$

$$x^2 + 6x + 3^2 = -8 + 9$$

$$(x+3)^2 = 1$$

$$x+3 = \pm 1$$

$$x = -3 \pm 1$$

$$x = -2, -4$$

EX:

$$x^2 - 12x + 4 \quad -4 = 3 \quad -4$$

$$x^2 - 12x + (-6)^2 = -1 + 36$$

$$(x-6)^2 = 35$$

$$x-6 = \pm \sqrt{35}$$

$$x = 6 \pm \sqrt{35}$$

$$x^2 - \sqrt{x} + 4 = 0$$

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

$$\left(x - \frac{\sqrt{x}}{2}\right)^2 = \frac{-16 + 2\sqrt{x}}{4} = \frac{9}{4}$$

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

$$x - \frac{\sqrt{x}}{2} = \frac{3}{2}$$

$$x - \frac{\sqrt{x}}{2} = -\frac{3}{2}$$

$$x = \frac{8}{2}$$

$$x = \frac{2}{2}$$

$$x = 4$$

$$x = 1$$

$$\frac{ax^2 + bx + c}{a} = \frac{0}{a}$$

$$x^2 + \frac{b}{a}x + \frac{c}{a} = 0$$

$$x^2 + \frac{b}{a}x + \left(\frac{b}{2a}\right)^2 = -\frac{c}{a} \cdot \frac{4a}{4a} + \frac{b^2}{4a^2}$$
$$\left(x + \frac{b}{2a}\right)^2 = \frac{b^2 - 4ac}{4a^2}$$

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

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

10.3 Solving Quadratic Equations Using the Quadratic Formula

$$ax^2+bx+c=0$$

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

discriminant

p 801

EX:

$$x^2 + 6x + 8 = 0$$

$$a = 1$$

$$b = 6$$

$$c = 8$$

$$x = \frac{-6 \pm \sqrt{6^2 - 4(1)(8)}}{2(1)}$$

$$= \frac{-6 \pm \sqrt{36 - 32}}{2}$$

$$= \frac{-6 \pm \sqrt{4}}{2}$$

$$= \frac{-6 \pm 2}{2}$$

$$= \frac{-6+2}{2}, \frac{-6-2}{2}$$

$$= \frac{-4}{2}, \frac{-8}{2}$$

$$x = -2, -4$$

EX: $6x^2 + 7x - 12 = 0$

$a = 6$

$b = 7$

$c = -12$

$$x = \frac{-7 \pm \sqrt{7^2 - 4(6)(-12)}}{2(6)}$$

$$= \frac{-7 \pm \sqrt{49 + 288}}{12}$$

$$x = \frac{-7 \pm \sqrt{337}}{12}$$

10.4 Complex Numbers

Imaginary number

Complex number

Adding and Subtracting Complex Numbers

Multiplying Complex Numbers

p 812

Quadratic Equations with Complex Roots

p 813