

$$566/9 \quad x^2 - 8x = -12$$

$$x^2 - 8x + (-4)^2 = -12 + 16$$

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

$$x-4 = \pm 2$$

$$x-4 = 2$$

$$x = 6$$

$$x-4 = -2$$

$$x = 2$$

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

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

$$x+2 = \pm 4$$

$$x+2 = 4$$

$$x = 2$$

$$x+2 = -4$$

$$x = -6$$

$$24. \frac{3x^2 - 12x + 14}{3} = \frac{0}{3}$$

$$x^2 - 4x + \frac{14}{3} = 0$$

$$x^2 - 4x + (-2)^2 = -\frac{14}{3} + \frac{4 \cdot 3}{1 \cdot 3}$$

$$(x-2)^2 = \frac{-14+12}{3}$$

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

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

$$26. 4x^2 = -20x + 3$$

$$x^2 = -\frac{5}{2}x + \frac{3}{4}$$

$$x^2 + \frac{5}{2}x + \left(\frac{\frac{5}{2}}{2}\right)^2 = \frac{3}{4} + \frac{25}{4}$$

$$\left(x + \frac{5}{4}\right)^2 = \frac{28}{4}$$

$$x + \frac{5}{4} = \pm \frac{\sqrt{28}}{2}$$

$$x = \frac{-\frac{5}{4} \pm \sqrt{28}}{2}$$

$$= 7$$

$$x + \frac{5}{4} = \pm \sqrt{7}$$

$$x = -\frac{5}{4} \pm \sqrt{7}$$

9.3: Solving Quadratic Equations by the Quadratic Formula

$$ax^2 + bx + c = 0, \quad a \neq 0$$

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

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

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

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

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

$$4x^2 = -20x + 3$$

$$4x^2 + 20x - 3 = 0$$

$$a = 4$$

$$b = 20$$

$$c = -3$$

$$x = \frac{-20 \pm \sqrt{(20)^2 - 4(4)(-3)}}{2(4)}$$

$$= \frac{-20 \pm \sqrt{400 + 48}}{8}$$

$$x = \frac{-20 \pm \sqrt{448}}{8}$$

Find the Quadratic Formula

Ex: (p 574)

$$8. x^2 - 5x - 6 = 0$$

$$10. 7k^2 + 3k - 1 = 0$$

$$x^2 - 5x - 6 = 0$$

$$a = 1$$

$$b = -5$$

$$c = -6$$

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(1)(-6)}}{2(1)}$$

$$= \frac{5 \pm \sqrt{25 + 24}}{2}$$

$$x = \frac{5 \pm \sqrt{49}}{2}$$

$$x = \frac{5 \pm 7}{2}$$

$$x = \frac{5+7}{2}$$

$$x = 6$$

$$x = \frac{5-7}{2}$$

$$x = -1$$

$$x^2 - 5x - 6 = 0$$

$$x^2 - 5x + \left(-\frac{5}{2}\right)^2 = \frac{6 \cdot 4}{1 \cdot 4} + \frac{25}{4}$$

$$\left(x - \frac{5}{2}\right)^2 = \frac{24 + 25}{4}$$

$$x - \frac{5}{2} = \pm \frac{7}{2}$$

$$x - \frac{5}{2} = \frac{7}{2}$$

$$x = \frac{12}{2}$$

$$x = 6$$

$$x - \frac{5}{2} = -\frac{7}{2}$$

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

$$x = -1$$

$$7k^2 + 3k - 1 = 0$$

18. $5x^2 = 15$

20. $m^2 - 14 = 5m$

38. $5y^2 = 4 - y$

40. $2z^2 = z + 3$

42. $k^2 + 2k + 5 = 0$

48. $\frac{m^2}{2} = 3m - 1$

54. $\frac{2}{3}x^2 - 2x - \frac{2}{3} = 0$

58. $y^2 - 2\sqrt{5}y - 1 = 0$

9.4: Complex Solutions of Quadratic Equations

Imaginary Unit i

The imaginary unit, written i , is the number whose square is -1 . That is,

$$i^2 = -1 \quad \text{and} \quad i = \sqrt{-1}$$

Complex Numbers and Pure Imaginary Numbers

A complex number is a number that can be written in the form

$$a + bi$$

where a and b are real numbers. A complex number that can be written in the form

$$0 + bi$$

$b \neq 0$, is also called a pure imaginary number.

Ex: (p 583)

10. $(-7 + 2i) + (5 - 3i)$

14. $(-6 + i) - (3 + i)$

18. $-2i(5 + 4i)$

20. $(6 + 2i)(4 - i)$

22. $(-9 + 2i)(-9 - 2i)$

34. $y^2 - 2y + 5 = 0$

36. $8x^2 - 7x + 2 = 0$

38. $5m^2 - 6m + 7 = 0$