

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

$$w^2 - 30w + (-15)^2 = (w-15)^2$$

EX:

$$x^2 - 12x + 3 = 0$$

$$x^2 - 12x + (-6)^2 = -3 + 36$$


$$(x-6)^2 = 33$$

$$x-6 = \pm \sqrt{33}$$

$$x = 6 \pm \sqrt{33}$$

9.2: Solving Quadratic Equations by Completing the Square

$$x^2 + 14x - 3 = 0$$

$$x^2 + 14x + (7)^2 = 3 + 49$$


$$(x+7)^2 = 52$$

$$x+7 = \pm \sqrt{52}$$

$$x = -7 \pm \sqrt{52}$$

Ex: (p 566)

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

$$12. z^2 + 6z - 9 = 0$$

$$14. y^2 + 4y = 0$$

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

$$x^2 - 10x + (-5)^2 = -24 + 25$$

$$(x-5)^2 = 1$$

$$x-5 = \pm 1$$

$$x-5 = 1$$

$$x = 6$$

$$x-5 = -1$$

$$x = 4$$

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

$$(x-6)(x-4) = 0$$

$$x-6 = 0$$

$$x = 6$$

$$x-4 = 0$$

$$x = 4$$

$$z^2 + 6z - 9 = 0$$

$$z^2 + 6z + \underbrace{(3)^2}_{4} = 9 + 9$$

$$(z+3)^2 = 18$$

$$z+3 = \pm \sqrt{18}$$

$$z = -3 \pm \sqrt{18}$$

$$y^2 + 4y + \underbrace{(2)^2}_{4} = 0 + 4$$

$$(y+2)^2 = 4$$

$$y+2 = \pm 2$$

$$y+2 = 2$$

$$y = 0$$

$$y+2 = -2$$

$$y = -4$$

$$y^2 + 4y = 0$$

$$y(y+4) = 0$$

$$y=0 \quad y+4=0$$

$$y = -4$$

$$18. x^2 - 4x + 2 = 0$$

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

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

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

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

$$20. y^2 - 5y + 6 = 0$$

$$y^2 - 5y + \left(-\frac{5}{2}\right)^2 = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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

$$y - \frac{5}{2} = \pm \frac{1}{2}$$

$$y - \frac{5}{2} = \frac{1}{2}$$

$$y = \frac{5}{2} + \frac{1}{2}$$

$$y = 3$$

$$y - \frac{5}{2} = -\frac{1}{2}$$

$$y = \frac{5}{2} - \frac{1}{2}$$

$$y = 2$$

$$y^2 - 5y + 6 = 0$$

$$(y-2)(y-3) = 0$$

$$y-2=0$$
$$y=2$$

$$y-3=0$$
$$y=3$$

24. $3x^2 - 12x + 14 = 0$

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

9.3: Solving Quadratic Equations by the Quadratic Formula

Find the Quadratic Formula

Ex: (p 574)

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

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

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