

Quiz

SOLVE

1. $x^2 + 7 = 6x$

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

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

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

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

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

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

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

$$(x-2)(x-2) = 0$$

$$x = 2$$

$$3. \quad (5 - 4x)^2 = 75$$

$$5 - 4x = \pm \sqrt{75}$$

$$-4x = -5 \pm \sqrt{75}$$

$$4x = 5 \pm \sqrt{75}$$

$$x = \frac{5 \pm \sqrt{75}}{4}$$

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

$$a = 7$$

$$b = 3$$

$$c = -1$$

$$k = \frac{-3 \pm \sqrt{3^2 - 4(7)(-1)}}{2(7)}$$

$$= \frac{-3 \pm \sqrt{9 + 28}}{14}$$

$$k = \frac{-3 \pm \sqrt{37}}{14}$$

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

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

$$\frac{3}{1} \left(\frac{2}{3}x^2 - 2x - \frac{2}{3} \right) = (0)3$$

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

$$x^2 - 3x - 1 = 0$$

$$x^2 - 3x + \left(-\frac{3}{2}\right)^2 = \frac{1 \cdot 4 + 9}{1 \cdot 4} \cdot \frac{1}{4}$$

$$\left(x - \frac{3}{2}\right)^2 = \frac{13}{4}$$

$$x - \frac{3}{2} = \pm \frac{\sqrt{13}}{2}$$

$$x = \frac{3 \pm \sqrt{13}}{2}$$

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

$$y^2 - 2\sqrt{5}y + (-\sqrt{5})^2 = 1 + 5$$

$$(y - \sqrt{5})^2 = 6$$

$$y - \sqrt{5} = \pm \sqrt{6}$$

$$y = \sqrt{5} \pm \sqrt{6}$$

9.4: Complex Solutions of Quadratic Equations

Note: $x^2 = -9$
no real solution

Remember:

$$5 - 2 = 3$$

$$2 - 5 = -3$$

$$\frac{6}{2} = 3$$

$$\frac{2}{6} = \frac{2}{6} = \frac{1}{3}$$

$$x^2 = 9$$

$$x = 3, -3$$

$$x^2 = -9$$

Simpler Problem

$$x^2 = -1$$

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

↑ imaginary number

$$\sqrt{-1} = i$$

$$\begin{array}{|l} x^2 = 7 \\ x = \pm \sqrt{7} \end{array}$$

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