Test III

28. $$\frac{4 + \frac{4}{y-3}}{y + \frac{2}{y-3}} = \frac{\frac{4(y-3)+4}{y-3}}{\frac{y(y-3)+2}{y-3}}$$

$$\frac{4y-12+4}{y-3} \cdot \frac{y-3}{y^2-3y+2}$$

$$\frac{4y-8}{1} \cdot \frac{1}{(y-2)(y-1)}$$

$$\frac{4(y-2)}{(y-2)(y-1)} \qquad \frac{4}{y-1}$$

27. $\dfrac{\frac{1}{3}}{\frac{4}{9}} = \frac{1}{3} \cdot \frac{9}{4} = \frac{3}{4}$

28. $\dfrac{\frac{a^a}{g^a} + \frac{g^g}{a^g}}{\frac{a^a}{g^a} - \frac{g^g}{a^g}} = \dfrac{\frac{a^2 + g^2}{g^a}}{\frac{a^2 - g^2}{g^a}}$

$\dfrac{a^2+g^2}{g^a} \cdot \dfrac{g^a}{a^2-g^2} = \dfrac{a^2+g^2}{a^2-g^2}$

26. $\dfrac{4}{3n^2-27n+60} - \dfrac{4}{4n^2-20n}$

$\dfrac{4}{3(n^2-9n+20)} - \dfrac{4}{4n(n-5)}$

$\dfrac{4n}{3(n-5)(n-4)n} - \dfrac{1 \cdot 3(n-4)}{n(n-5)3(n-4)}$

$\dfrac{4n-3(n-4)}{3n(n-5)(n-4)}$

$\dfrac{4n-3n+12}{3n(n-5)(n-4)}$

$\dfrac{n+12}{3n(n-5)(n-4)}$

24. $\dfrac{3(x+3)}{(x+3)(x-3)(x+3)} + \dfrac{4(x-3)}{(x+3)^2(x-3)}$

$$\frac{3(x+3) + 4(x-3)}{(x+3)^2(x-3)}$$

$$\frac{3x+9+4x-12}{(x+3)^2(x-3)}$$

$$\frac{7x-3}{(x+3)^2(x-3)}$$

15. $$\frac{2}{8+y} + \frac{y+9}{8+y} = \frac{y+11}{8+y}$$

16.

$$\frac{12x^2}{x-2} - \frac{4+11x^2}{x-2}$$

$$\frac{12x^2 - (4+11x^2)}{x-2}$$

$$\frac{12x^2 - 4 - 11x^2}{x-2} = \frac{x^2-4}{x-2}$$

$$\frac{(x+2)\cancel{(x-2)}}{\cancel{x-2}} = x+2$$

23. $\dfrac{7(x-1)}{\sqrt{x}(x-1)} + \dfrac{1\cdot\sqrt{x}}{(x-1)\sqrt{x}}$

$$\frac{7(x-1)+\sqrt{x}}{\sqrt{x}(x-1)} = \frac{7x-7+\sqrt{x}}{\sqrt{x}(x-1)}$$

$$\frac{12x-7}{\sqrt{x}(x-1)}$$

30. $\dfrac{\dfrac{7}{(x-6)(x-8)}+\dfrac{x}{(x-8)(x-6)}}{\dfrac{2}{(x-5)(x-6)}-\dfrac{1}{(x-6)(x-5)}} = \dfrac{\dfrac{7(x-8)+x(x-6)}{(x-6)(x-8)}}{\dfrac{2(x-6)-(x-5)}{(x-5)(x-6)}}$

$\dfrac{7x-56+x^2-6x}{(x-6)(x-8)} \cdot \dfrac{(x-5)(x-6)}{2x-12-x+5}$

$\dfrac{x^2+x-56}{x-8} \cdot \dfrac{x-5}{x-7}$

$\dfrac{(x+8)(x-7)(x-5)}{(x-8)(x-7)} = \dfrac{(x+8)(x-5)}{x-8}$

Chapter 9: Quadratic Equations

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

EX: $x^2-5x+6=0$

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

$x-2=0$ $\quad$ $x-3=0$

$x=2$ $\quad$ $x=3$

EX: $x^2=16$

$x=4,-4$

or

$x=\pm 4$

$x^2-16=0$

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

$x+4=0$ $\quad$ $x-4=0$

$x=-4$ $\quad$ $x=4$

Ex: $x^2 = 11$

$x = \sqrt{11}, -\sqrt{11}$ or $\pm\sqrt{11}$

Aside: $\sqrt{9}$ is that positive (non-negative) number whose square is 9. $\sqrt{9} = 3$

$x = \sqrt{16}$ $\quad$ $x^2 = 16$

$x = 4$ $\quad$ $x = 4, -4$

9.1: Solving Quadratic Equations by the Square Root Property

**Square Root Property**

If $x^2 = a$ for $a \geq 0$, then

$$x = \sqrt{a} \quad \text{or} \quad x = -\sqrt{a}$$

Ex: (p 560)

2. $x^2 = 121$ $x = 11, -11$ $\pm 11$

4. $x^2 = 22$ $x = \sqrt{22}, -\sqrt{22}$ $\pm\sqrt{22}$

10. $5x^2 = 2$ $x =$

12. $2x^2 = 9$ $x =$

$5x^2 = 2$

$x^2 = \frac{2}{5}$

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

$2x^2 = 9$

$x^2 = \frac{9}{2}$

$x = \pm\sqrt{\frac{9}{2}}$

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

**14.** $x^2 - 15 = 0$

**16.** $7x^2 - 21 = 0$

**22.** $(x - 7)^2 = 2$

**24.** $\left(m + \frac{1}{3}\right)^2 = \frac{1}{9}$

**30.** $(z + 7)^2 = -20$

**32.** $(3x - 17)^2 = 28$

**34.** $(5x - 11)^2 = 54$

**36.** $(3p - 1)^2 = 4$

# 9.2: Solving Quadratic Equations by Completing the Square

## Ex: (p 566)

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

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

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

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

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

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