

$$\overbrace{x^2 - 7x + 12}$$

$$\frac{12}{3, 4}$$

$$\underbrace{x^2 - 3x}_{\text{blue}} - \underbrace{4x + 12}_{\text{green}}$$

$$x(x-3) - 4(x-3)$$

$$(x-3)(x-4)$$

$$x^2 - 7x + 12$$

$$(x-3)(x-4)$$

$$56. 100 - \frac{4}{81}n^2 = 4 \left(25 - \frac{1}{81}n^2 \right)$$

$$4 \left[(5)^2 - \left(\frac{1}{9}n \right)^2 \right]$$

$$4 \left(5 + \frac{1}{9}n \right) \left(5 - \frac{1}{9}n \right)$$

$$64. 100x^3y - 49xy^3 = xy (100x^2 - 49y^2)$$

$$xy \left[(10x)^2 - (7y)^2 \right]$$

$$xy (10x + 7y) (10x - 7y)$$

$$70. 25y^4 - 100y^2 = 25y^2 (y^2 - 4)$$

$$25y^2 (y+2)(y-2)$$

6.6: Solving Quadratic Equations by Factoring

Quadratic Equation

A quadratic equation is one that can be written in the form

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

where a , b , and c are real numbers and $a \neq 0$.

NOTE: $\nabla ab = 0$
 $a = 0 \quad \text{or} \quad b = 0$

$\nabla ab = 6$
 $\nabla a = 5, \quad b = \frac{6}{5}$

All ∇ can say is

(1) $a, b \neq 0$

(2) same sign

Zero Factor Theorem

If a and b are real numbers and if $ab = 0$, then $a = 0$ or $b = 0$.

Ex: (p 408)

2. $(x+4)(x-10) = 0$

4. $(x+11)(x+1) = 0$

6. $x(x-7) = 0$

$$(x+4)(x-10) = 0$$

$$x+4 = 0$$

$$x = -4$$

$$x-10 = 0$$

$$x = 10$$

$$(x+11)(x+1) = 0$$

$$x+11 = 0$$

$$x = -11$$

$$x+1 = 0$$

$$x = -1$$

$$x(x-7) = 0$$

$$x = 0, 7$$

20. $x^2 + 2x - 63 = 0$

22. $x^2 - 5x + 6 = 0$

24. $x^2 - 3x = 0$

$$x^2 + 2x - 63 = 0$$

$$(x-7)(x+9) = 0$$

$$x-7 = 0$$

$$x = 7$$

$$x+9 = 0$$

$$x = -9$$

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

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

$$x-3 = 0$$

$$x = 3$$

$$x-2 = 0$$

$$x = 2$$

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

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

$$x = 0$$

$$x - 3 = 0$$

$$x = 3$$

28. $x^2 = 9$

30. $(x+3)(x+8) = x$

32. $x(4x-11) = 3$

$$x^2 = 9$$

$$x = 3, -3$$

$$x^2 - 9 = 0$$

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

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

$$(x+3)(x+8) = x$$

$$x^2 + 8x + 3x + 24 = x$$

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

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

$$x+6 = 0$$

$$x = -6$$

$$x+4 = 0$$

$$x = -4$$

$$x(4x - 11) = 3$$

$$\frac{-12}{12, 1}$$

$$4x^2 - 11x = 3$$

$$4x^2 - 11x - 3 = 0$$

$$4x^2 - 12x + x - 3 = 0$$

$$4x(x - 3) + 1(x - 3) = 0$$

$$(x - 3)(4x + 1) = 0$$

$$x - 3 = 0$$

$$x = 3$$

$$4x + 1 = 0$$

$$4x = -1$$

$$x = -\frac{1}{4}$$

$$34. -2y^2 + 72 = 0$$

$$36. 6x^2 + 57x = 30$$

$$-2y^2 + 72 = 0$$

$$-2(y^2 - 36) = 0$$

$$-2(y+6)(y-6) = 0$$

$$-2 = 0$$

X

$$y+6=0$$

$$y=-6$$

$$y-6=0$$

$$y=6$$

$$6x^2 + 57x = 30$$

$$6x^2 + 57x - 30 = 0$$

$$3(2x^2 + 19x - 10) = 0 \quad \underline{-20}$$

$$3[2x^2 + 20x - x - 10] = 0$$

$$3[2x(x+10) - 1(x+10)] = 0$$

$$3(x+10)(2x-1) = 0$$

$$3 = 0$$

$$x + 10 = 0$$

$$2x - 1 = 0$$

X

$$x = -10$$

$$2x = 1$$

$$x = \frac{1}{2}$$

42. $4y^3 - 36y = 0$

44. $15x^3 + 24x^2 - 63x = 0$

46. $(x - 6)(x + 7) = 0$

48. $x^2 + 15x = 0$

50. $5(3 - 4x) = 9$

52. $4y^2 - 81 = 0$

60. $9x^2 + 7x = 2$

62. $3x^2 - 6x - 9 = 0$

64. $(y - 5)(y - 2) = 28$

74. $2x^2 + 12x - 1 = 4 + 3x$

76. $4x^2 - 20x = -5x^2 - 6x - 5$