86. $16x^2 + 4xy^2 + 8xy + 2y^3$

$2(8x^2 + 2xy^2 + 4xy + y^3)$

$2[2x(4x + y^2) + y(4x + y^2)]$

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

6.2: Factoring Trinomials of the Form $x^2 + bx + c$

Multiply out two binomials

Ex: $(x+3)(x+4)$

$x^2+4x+3x+12$

$x^2+(4+3)x+12$

$x^2+7x+12$

$(x+a)(x+b) = x^2+(a+b)x+ab$

$x^2+bx+ax+ab$

Factoring a Trinomial of the Form $x^2 + bx + c$

The factored form of $x^2 + bx + c$ is

The product of these numbers is c.

$$x^2 + bx + c = (x + \square)(x + \square)$$

The sum of these numbers is b.

Ex: (p 376)

2. $x^2 + 6x + 8 = (x \quad)(x \quad)$

8

1, 8

2, 4

$(x \quad 2)(x \quad 4)$

$(x+2)(x+4)$

4. $y^2 - 12y + 11 = (y - 1)(y - 11)$

11

1, 11

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

25

1, 25

5, 5

8. $x^2 - x - 30 = (x \quad)(x \quad)$

$(x + 5)(x - 6)$

-30

1, 30

2, 15

3, 10

5, 6

$+5x$

$-6x$

10. $x^2 + 4x - 32 = (x + 8)(x - 4)$

-32

1, 32

8, 4

$+8x$

$-4x$

12. $x^2 - 7x + 5$ not factorable

5

1, 5

48. $3x^3 + 3x^2 - 126x$

$3x(x^2 + x - 42)$

$3x(x + 7)(x - 6)$

$+7x$

$-6x$

15

1, 15

3, 5

50. $3x^2y - 9xy + 45y$

$3y(x^2 - 3x + 15)$

$x^2 - 5x + 6 = (x-2)(x-3)$

$\frac{6}{1,6}$

$2,3$

$x^2 + 5x - 6 = (x-1)(x+6)$

54. $x^2 - 3xy - 4y^2$

$\frac{-4}{1,4}$

$(x + 1y)(x - 4y)$

62. $7a^3b - 35a^2b^2 + 42ab^3$

$7ab(a^2 - 5ab + 6b^2)$

$7ab(a-2b)(a-3b)$

66. $-x^2 + 8x - 7 = -(x^2 - 8x + 7)$

$-(x-7)(x-1)$

68. $\frac{1}{3}y^2 - \frac{5}{3}y - 8 = \frac{1}{3}(y^2 - 5y - 24)$

$\frac{1}{3}(y+3)(y-8)$

6.3: Factoring Trinomials of the Form $ax^2 + bx + c$ and Perfect Square Trinomials

Multiply two binomials

Two Strategies: guess & check
key numbering (by grouping)

Ex: (p 384)

2. $2y^2 + 27y + 25 = (2y + 25)(\quad)$

4. $6y^2 + 11y - 10 = (2y + 5)(\quad)$

6. $4y^2 - 20y + 25 = (2y - 5)(\quad)$

8. $3x^2 + 8x + 4$

10. $21x^2 - 31x + 10$

14. $3x^2 + 20x - 63$

18. $3n^2 + 20n + 5$

20. $8x^2 - 14xy + 3y^2$

24. $8a^3 + 14a^2 + 3a$

30. $8x^2y + 34xy - 84y$

34. $-x^2 + 4x + 21$

40. $x^2 + 18x + 81$

42. $x^2 - 12x + 36$

44. $25x^2 - 20x + 4$

46. $m^4 + 10m^2 + 25$

48. $3y^2 - 6y + 3$

50. $9y^2 + 48y + 64$

52. $2x^2 + 7x - 72$

57. $-9x + 20 + x^2$

60. $m^2 + 20mn + 100n^2$

72. $-15x^2 + 26x - 8$

68. $12x^3 - 34x^2 + 24x$

74. $9q^4 - 42q^3 + 49q^2$

80. $1 + 16x^2 + x^4$

92. $3a^2b^2 + 12ab + 1$

Ex: (p 390)

14. $15x^2 + 11x + 2$

20. $2x^2 - 7x + 3$

34. $30a^2 + 38a - 20$

6.5: Factoring Binomials

Ex: (p 396)

2. $x^2 - 36$

6. $49a^2 - 16$

14. $-9t^2 + 1$

20. $n^4 - 16$

38. $x^2 - 225y^2$

44. $36x^2y - 25y$

56. $100 - \frac{4}{81}n^2$

64. $100x^3y - 49xy^3$

70. $25y^4 - 100y^2$

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 $a \neq 0$.

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. $x(x - 7) = 0$

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

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

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

28. $x^2 = 9$

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

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

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

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

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