

Quiz

Factor

1. $\underline{6x^3 - 4x^2} + \underline{15x - 10}$

$$2x^2(\underline{3x-2}) + 5(\underline{3x-2})$$
$$(3x-2)(2x^2+5)$$

2. $x^2 + 8xy + 15y^2$

$$(x + 3y)(x + 5y)$$

3. $x^2 - 14x - 15$

$$(x - 15)(x + 1)$$

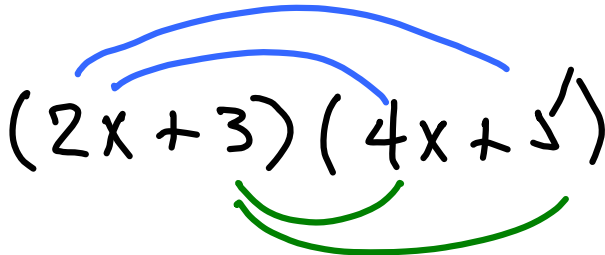
4. Divide: $\frac{-12a^3 + 36a^2 - 3a}{3a}$

$$-4a^2 + 12a - 1$$

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

Multiply two binomials

EX: $(2x + 3)(4x + 5)$

The image shows the multiplication of two binomials, (2x + 3) and (4x + 5). Blue arcs connect the first terms (2x and 4x), the outer terms (2x and 5), and the inner terms (3 and 4x). A green arc connects the last terms (3 and 5).

$$8x^2 + 10x + 12x + 15$$

$$8x^2 + (10 + 12)x + 15$$

$$8x^2 + 22x + 15$$

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

Ex: (p 384)

$$2. 2y^2 + 27y + 25 = (2y + 25)(y + 1)$$

$$4. 6y^2 + 11y - 10 = (2y + 5)(3y - 2)$$

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

$$8. \overbrace{3x^2 + 8x + 4}$$

$$\frac{12x^2}{2,6}$$

$$\underbrace{3x^2 + 2x} + \underbrace{6x + 4}$$

$$x(\underline{3x+2}) + 2(\underline{3x+2})$$

$$(3x+2)(x+2)$$

$$10. \overbrace{21x^2 - 31x + 10}$$

$$\frac{210}{10,21}$$

$$\underbrace{21x^2 - 10x} - \underbrace{21x + 10}$$

$$x(\underline{21x-10}) - 1(\underline{21x-10})$$

$$(21x-10)(x-1)$$

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

$$\underbrace{3x^2 - 7x} + \underbrace{27x - 63}$$

$$x(3x - 7) + 9(3x - 7)$$

$$(3x - 7)(x + 9)$$

$$\begin{array}{r} -189 \\ \hline 1, 189 \\ 3, 63 \\ 7, 27 \end{array}$$

$$18. \overbrace{3n^2 + 20n + 5}$$

not factorable

prime

$$\underline{15}$$

$$20. \overbrace{8x^2 - 14xy + 3y^2}$$

$$\frac{24}{12, 2}$$

$$\underbrace{8x^2 - 12xy} - \underbrace{2xy} + 3y^2$$

$$4x(\underline{2x - 3y}) - y(\underline{2x - 3y})$$
$$(2x - 3y)(4x - y)$$

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

$$\frac{24a^2}{2, 12}$$

$$a(\overbrace{8a^2 + 14a + 3})$$

$$a[\underbrace{8a^2 + 2a} + \underbrace{12a + 3}]$$

$$a[2a(\underline{4a + 1}) + 3(\underline{4a + 1})]$$

$$a(4a + 1)(2a + 3)$$

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