

Review: multiply the polynomials.

$$(a-b)(a+b) = \cancel{aa} + \cancel{ab} - \cancel{ba} - \cancel{bb} \\ = a^2 - b^2$$

$$(a+b)(a+b) = \cancel{aa} + \cancel{ab} + \cancel{ba} + \cancel{bb} \\ (a+b)^2 = a^2 + 2ab + b^2$$

$$(a-b)(a-b) = \cancel{aa} - \cancel{ab} - \cancel{ba} + \cancel{bb} \\ (a-b)^2 = a^2 - 2ab + b^2$$

$$(a+b)(a^2 - ab + b^2) = \cancel{aa^2} - \cancel{aab} + \cancel{ab^2} + \cancel{ba^2} - \cancel{bab} + \cancel{bb^2} \\ = a^3 - \cancel{a^2b} + \cancel{ab^2} + \cancel{a^2b} - \cancel{ab^2} + b^3 \\ = a^3 + b^3$$

$$(a-b)(a^2 + ab + b^2) = \cancel{a^3} + \cancel{a^2b} + \cancel{ab^2} - \cancel{a^2b} - \cancel{ab^2} - \cancel{b^3} \\ = a^3 - b^3$$

Factoring by Grouping

$$28. \quad 3(x+y) + a(x+y) \quad \begin{array}{l} 3c + ac \\ c(3+a) \end{array} \\ (x+y)(3+a)$$

$$30. \quad 3(a-7) - b(7-a) \\ 3(a-7) + b(a-7) \\ (a-7)(3+b)$$

$$\begin{aligned} 32. & \quad \underbrace{x^2 - 5x} + \underbrace{4x - 20} \\ & \quad x(x-5) + 4(x-5) \\ & \quad (x-5)(x+4) \end{aligned}$$

$$\begin{aligned} 34. & \quad \underbrace{ab + 7b} - \underbrace{3a - 21} \\ & \quad b(a+7) - 3(a+7) \\ & \quad (a+7)(b-3) \end{aligned}$$

$$\begin{aligned} 38. & \quad \underbrace{a^2b + 3a^2} + \underbrace{2b + 6} \\ & \quad a^2(b+3) + 2(b+3) \\ & \quad (b+3)(a^2+2) \end{aligned}$$

Factor trinomials of the form ax^2+bx+c

When $a=1$, we look for factors of c that sum to b .

When a is any constant other than 1, we will

- look for factors of $c \cdot a$ that sum to b ,
- rewrite bx as a sum of two terms whose coefficients are those factors,
- factor by grouping.

$$80. \quad 6y^2 + 5y - 6$$

$$6(-6) = -36 = 9(-4)$$

$$\underline{6y^2 + 9y} - \underline{4y - 6}$$

$$3y(2y+3) - 2(2y+3)$$

$$(2y+3)(3y-2)$$

$$88. 4a^2 - a - 5$$

$$4(-5) = -20$$

$$4a^2 + 4a - 5a - 5$$

$$4a(a+1) - 5(a+1)$$

$$(a+1)(4a-5)$$

$$100. 6x^2 + 41xy - 7y^2$$

$$6(-7) = -42 = 42(-1)$$

$$6x^2 + 42xy - xy - 7y^2$$

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

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

$$106. \quad 6 - 7x - 5x^2 = -5x^2 - 7x + 6$$

$$(-5)(6) = -30 = (-10)(3)$$

$$-5x^2 - 10x + 3x + 6$$

$$-5x(x+2) + 3(x+2)$$

$$(x+2)(-5x+3)$$

$$(x+2)(3-5x)$$

$$114. \quad 8a^4 + 37a^3b - 15a^2b^2$$

$$a^2(8a^2 + 37ab - 15b^2)$$

$$\overset{\hat{2}}{8} \overset{\hat{3}}{(-15)} = \overset{\hat{40}}{(40)} \overset{\hat{-3}}{(-3)}$$

$$\overset{\hat{2 \cdot 2 \cdot 2}}{2 \cdot 2 \cdot 2} \cdot \overset{\hat{3 \cdot 5}}{3 \cdot 5} \cdot (-1)$$

$$8a^4 + 40a^3b - 3a^3b - 15a^2b^2$$

$$8a^3(a+5b) - 3a^2b(a+5b)$$

$$(a+5b)(8a^3 - 3a^2b)$$

$$a^2(a+5b)(8a-3b)$$

$$122. \quad 2a^2b^4 + 9ab^3 - 18b^2$$

$$b^2 [2a^2b^2 + 9ab - 18]$$

$$2(-18) = -36 = (12)(-3)$$

$$b^2 [2a^2b^2 + 12ab - 3ab - 18]$$

$$b^2 [2ab(ab + 6) - 3(ab + 6)]$$

$$b^2 (ab + 6)(2ab - 3)$$

$$136. \quad X^{3n} + 10X^{2n} + 16X^n$$

$$X^n (X^{2n} + 10X^n + 16)$$

$$X^n X^{2n} = X^{n+2n} = X^{3n}$$

$$X^n (X^n + 2)(X^n + 8)$$

$$96. \quad 10x^2 - 29x + 10$$

$$10(10) = 100 = (-25)(-4)$$

$$10x^2 - 25x - 4x + 10$$

$$5x(2x-5) - 2(2x-5)$$

$$(2x-5)(5x-2)$$

$$98. \quad 4x^2 - 6x + 1$$

$$4(1)$$

Does not factor

Textbook Homework Problems:

5.4 #19-25 odd; 27-43 odd; 55-61 odd

5.5 #21-47 odd

5.5 #79-137 odd

Quiz #6 on multiplying/dividing polynomials and factoring - Fri Oct 4

Test #3 - Tues Oct 8

Test #4 - Fri Oct 18

Final Exam - Week of Oct 28!