Name: Course/Section: Instructor:

Chapter 13 Factoring Polynomials and Solving Equations
13.5 Summary of Factoring

Guidelines for Factoring Polynomials ~ Factoring Polynomials

Foil is right / wrong credit was posted

Key Terms

Exercises: Use the vocabulary terms listed below to complete each statement. Note that some terms or expressions may not be used. Some terms may be used more than once.

a^2+b^2	**FOIL**
$(a+b)^2$	**grouping**
a^2-b^2	**perfect square**
$(a-b)^2$	**sum of two cubes**
a^3+b^3	**completely factored**
a^3-b^3	**difference of two squares**
	perfect square trinomial
	greatest common factor (GCF)
	difference of two cubes

Guidelines for Factoring Polynomials

STEP 1: Factor out the GCF, if possible.

STEP 2: **A.** If the polynomial has four terms, try factoring by grouping.

B. If the polynomial is a binomial, try one of the following.

1. a^2-b^2 $=(a-b)(a+b)$ This is referred to as a(n) diff of squares
2. a^3-b^3 $=(a-b)(a^2+ab+b^2)$ This is referred to as a(n) diff of cubes
3. a^3+b^3 $=(a+b)(a^2-ab+b^2)$ This is referred to as a(n) sum of cubes

C. If the polynomial is a trinomial, check for a(n) perfect square

1. $a^2+2ab+b^2=$ $(a+b)^2$ This is referred to as a(n) perfect square trinomial
2. $a^2-2ab+b^2=$ $(a-b)^2$ This is referred to as a(n) perfect square trinomial

Otherwise, try to factor the trinomial by grouping or apply FOIL in reverse.

STEP 3: Check to make sure that the polynomial is completely factored.

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Factoring Polynomials

Exercises 1-8: Refer to Examples 1-8 on pages 830-832 in your text and the Section 13.5 lecture video.

Factor.

1. $5x^3 - 20x^2 + 25x$ $5x(x^2 - 4x + 5)$ 1. $5x(x^2 - 4x + 5)$

2. $4t^4 + 144t^2$ $4t^2(t^2 + 36)$ 2. $4t^2(t^2 + 36)$

3. $-45a^3 - 30a^2 - 5a$ $-5a(9a^2 + 6a + 1)$ $-5a(3a+1)^2$ 3. $-5a(3a+1)^2$

4. $5x^3 - 320$ $5(x^3 - 64)$ $5(x-4)(x^2+4x+16)$ 4. $5(x-4)(x^2+4x+16)$

5. $24x^4 + 10x^3 - 4x^2$ $2x^2(12x^2 + 5x - 2)$ 5. $2x^2(4x-1)(3x+2)$

AC B

24 5

12 8 -3

8

6

$12x^2 + 8x - 3x - 2$

$4x(3x+2) - 1(3x+2)$

$2x^2(4x-1)(3x+2)$

6. $8x^3 + 4x^2 - 72x - 36$ 6. $4(x-3)(x+3)(2x+1)$

$4x^2(2x+1) - 36(2x+1)$ $4(x-3)(x+3)(2x+1)$

$(4x^2 - 36)(2x+1)$

$4(x^2 - 9)(2x+1)$

7. $16a^3b - 36ab^3$ $4ab(4a^2 - 9b^2)$ $4ab(2a - 3b)(2a + 3b)$ 7. $4ab(2a-3b)(2a+3b)$

8. $12x^3 + 9x^2 + 20x + 15$ 8. $(3x^2+5)(4x+3)$

$3x^2(4x+3) + 5(4x+3)$

$(3x^2+5)(4x+3)$

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Chapter 13 Factoring Polynomials and Solving Equations
13.6 Solving Equations by Factoring I (Quadratics)

The Zero-Product Property ~ Solving Quadratic Equations ~ Applications

Key Terms

Exercises 1-5: Use the vocabulary terms listed below to complete each statement. Note that some terms or expressions may not be used.

zeros
standard form
zero-product
quadratic equation
quadratic polynomial

A) The zero-product property states that if the product of two numbers (or expressions) is 0, then at least one of the numbers (or expressions) must equal 0.

B) Any quad poly in the variable x can be written as ax^2+bx+c with $a \neq 0$.

C) The zeros of a polynomial in x are the values that, when substituted for x, result in 0.

D) Any quad eq in the variable x can be written as $ax^2+bx+c=0$ with $a \neq 0$.

E) The form $ax^2+bx+c=0$ is called the standard form of a quadratic equation.

The Zero-Product Property

Exercises 1-4: Refer to Example 1 on page 835 in your text and the Section 13.6 lecture video.

Solve each equation.

9. $x(x+2)=0$ $x=0 \quad x=-2$

10. $\frac{3a^2}{3}=\frac{0}{3}$

$a^2=0$ $a=0$

11. $(b+1)(b-4)=0$ $b=-1, 4$

12. $x(x-3)(x+5)=0$ $x=0, 3, -5$

Solving Quadratic Equations

Exercises 5-9: Refer to Examples 2-3 on pages 836-837 in your text and the Section 13.6 lecture video.

Solve each quadratic equation. Check your answers.

13. $x^2+4x=0$ $x(x+4)=0$ $x=0, -4$

14. $t^2=9$ $t=\pm 3$

$t^2-9=0$

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

$t=-3 \quad t=3$

15. $a^2-5a+6=0$ $a=2, 3$

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

$a=2, 3$

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16. $10x^2+7x=12$

AC 120 B 7 8 15 : 15-8

$10x^2+7x-12=0$

$10x^2+15x-8x-12=0$

$5x(2x+3)-4(2x+3)=0$

$(5x-4)(2x+3)=0$

$x=\frac{4}{5}, \frac{-3}{2}$

$x=\frac{4}{5}, \frac{-3}{2}$

17. Solve $2x^2-9x=5$.

$2x^2-9x-5=0$

$2x^2+1x-10x-5=0$

$x(2x+1)-5(2x+1)=0$

$(x-5)(2x+1)=0$

AC 10 B -9 1 -10 2 5

$x=5, -\frac{1}{2}$

$x=5, \frac{-1}{2}$

Applications

Exercises 10-12: Refer to Examples 4-6 on pages 838-839 in your text and the Section 13.6 lecture video.

18. The height h in feet of a baseball after t seconds is given by $h(t)=-16t^2+88t+4$. At what values of t is the height of the baseball 100 feet?

AC 24 B -11 -8 -3 8 3

$100 = -16t^2+88t+4$

$-100 \quad -100$

$0 = -16t^2+88t-96$

$0 = -8(+2t^2-11t+12)$

$2t^2-8t-3t+12$

$2t(t-4)-3(t-4)$

$t=\frac{3}{2}, 4$ sec

$-8(2t-3)(t-4)=0$

$t=\frac{3}{2} \quad t=4$

19. The braking distance D in feet required to stop a car traveling at x miles per hour on wet, level pavement can be approximated by $D=\frac{1}{9}x^2$.

$D=\frac{1}{9}(40)^2 \Rightarrow D=\frac{1}{9}1600 \Rightarrow D=$

(a) Calculate the braking distance for a car traveling at 40 miles per hour.

(a) 177.7 ft

(b) If the braking distance is 60 feet, estimate the speed of the car.

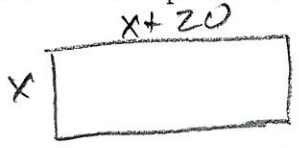
(b) 23.24 mph

$60=\frac{1}{9}x^2$

$540=x^2$

20. A digital photograph is 20 pixels longer than it is wide and has a total area of 3500 pixels. Find the dimensions of this photograph.

50 by 70 pixels



$x^2+20x=3500$

$x^2+20x-3500=0$

$(x+70)(x-50)=0$

$x=-70 \quad x=50$