# Module 7 Highlights

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Math 0098 Pre-college Algebra

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Things You Need to Know

Section 5.3 Polynomial Functions, Addition and Subtraction of Polynomials

1. In a term of the form $ax^n$, the real number $a$ is called the _________________, and the whole number $n$ is called the _________________ of the term. If a term contains only a number, it is called a _________________ term. (5.3, Obj. 1)

2. A polynomial is an algebraic expression that consists of a finite ________ of terms of the form __________, where $a$ is a real number and $n$ is a whole number. The standard form is to write the polynomials so that the degrees of the terms are in _________________ order. (5.3, Obj. 2)

3. The degree of a polynomial is the _________________ degree of the terms in the polynomial. The _________________ _______________ of a single-variable polynomial is the coefficient of the term with the largest degree. (5.3, Obj. 2)

4. To add polynomials, remove the _________________, group __________ terms together, combine __________ terms, and write the answer in ________________ form. (5.3, Obj. 4)

5. To subtract polynomials, find the _________________ of the polynomial being subtracted. Combine __________ terms and write the answer in ________________ form. If $P$ and $Q$ are polynomials, the $P − Q =$ ________________. (5.3, Obj. 4)

**For additional practice: Section 5.3 Exercises 9 – 27 odd, 51 – 65 odd**

Section 5.4 Multiplication of Polynomials and Polynomial Functions

6. To multiply a monomial by a polynomial, _________________ the monomial to each term of the polynomial. Multiply the _________________ and multiply and like bases by ________________ the exponents. (5.4, Obj. 1)

7. To multiply polynomials, distribute _________________ of the first polynomial to __________ __________ of the second polynomial. Simplify the resulting ________________. Combine __________ terms. Write the polynomial in _________________ form. (5.4, Obj. 2)

**For additional practice: Section 5.4 Exercises 3 - 39 odd**

Section 5.5 Special Products

8. To multiply two binomials, we can remember the word _________________ which stands for __________, __________, __________, and __________. (5.5, Obj. 1)

9. To square a binomial, we can use the property that $(a + b)^2 =$ _________________ and $(a − b)^2 =$ _________________. (5.5, Obj. 2)

10. _________________ are binomials with the same terms connected by opposite signs. (5.5, Obj. 3)

11. The product of conjugates is $(a + b)(a − b) =$ _________________. The product of conjugates always results in the _________________ of two __________. (5.5, Obj. 3)

**For additional practice: Section 5.5 Exercises 5 – 53 odd**
Section 5.6 Division of Polynomials

12. To divide a polynomial by a monomial, rewrite the problem so that each term in the _________________ is divided by the monomial in the _________________

The property is that \( \frac{A + B}{c} = \) _______________. (5.6, Obj. 1)

**For additional practice: Section 5.6 Exercises 7 – 29**

Chapter 5 Review Materials

- See Chapter 5 Summary on pages 431 - 432.
- Chapter 5 Review Exercises 35, 41 – 57, 59 – 65, 67, 68
- Chapter 5 Test Exercises 1 – 9, 11 – 31, 34, 35

Section 6.1 Greatest Common Factor and Grouping

13. The greatest common factor (GCF) of a set of integers is the _______________ integer that is a _______________ of each integer in the set. (6.1, Obj. 1)

14. To find the GCF of a set of integers, write each integer as a product of _______________ factors. (6.1, Obj. 3)

15. The GCF of variables in terms is the common variable raised to the _______________ exponent of the terms. (6.1, Obj. 2)

16. To find the GCF of a set of terms, find the GCF of the _______________ of the terms, find the GCF of the _______________ of the terms. Then the GCF of the terms is the _______________ of the GCF of the _______________ and the GCF of the _______________ factors. (6.1, Obj. 2)

17. To factor a polynomial using the greatest common factor, find the _______________ of the terms of the polynomial. Rewrite each term of the polynomial as a _______________ or the GCF and the remaining factor. Apply the _______________ property to factor out the GCF. Check by _______________.

(6.1, Obj. 3)

18. The grouping method of factoring applies to polynomials with _______________ or more terms. (6.1, Obj. 4)

19. To use grouping, group together _______________ of terms. Factor out the _______________ from each pair of terms. Factor out the common _______________ from both terms, if possible. Check by _______________.

(6.1, Obj. 4)

**For additional practice: Section 6.1 Exercises 9 – 79 odd**

Section 6.2 Factoring Trinomials

20. To factor a trinomial of the form \( x^2 + bx + c \), find the _______________ of \( c \) whose _______________ is \( b \). List the pairs of _______________ of the last term of the trinomial, \( c \). Determine the _______________ of the factors that produce the correct product. Choose the pair of factors whose _______________ is the middle coefficient, \( b \). Arrange the pair of factors in the _______________. Check by _______________.

(6.2, Obj. 1)

21. One of the key steps in factoring a polynomial is to factor out any _______________ factors first. (6.2, Obj. 2)

**For additional practice: Section 6.2 Exercises 5 – 51 odd**
Section 6.3 More on Factoring Trinomials

22. To factor a trinomial using **trial and error**, factor out any ____________ factors first, if possible. List the factors of the ___________ term of the trinomial. List the factors of the ___________ term of the trinomial. Determine the appropriate ____________ of the factors. Arrange these factors in two binomials until the __________ produces the given trinomial. Check by ________________. (6.3, Obj. 1)

23. To factor a trinomial using **grouping**, (6.3, Obj. 2)
   a. Factor out any ________________ factors.
   b. Find the product of the ___________ coefficient and the ___________ term; that is, ___________.
   c. List the factors of this number to find the pair of factors whose ___________ is $b$, the middle coefficient of the trinomial.
   d. Replace the ___________ term of the trinomial with a ____________ that uses the appropriate factors of $a \cdot c$.
   e. Factor by ________________.
   f. Check by ________________.

24. A ________________ ________________ trinomial is a trinomial whose factored form is obtained from squaring a binomial.

**For additional practice: Section 6.3 Exercises 9 – 63 odd**

Section 6.4 Factoring Binomials

25. The **difference of two squares** property states that $a^2 - b^2 = ________________$. (6.4, Obj. 1)

26. The **sum of squares** $a^2 + b^2$ ________________ be factored unless there is a ________________ factor. (6.4, Obj. 1)

27. The **sum and difference of two cubes** property states that (6.4, Obj. 2)
   \[
   a^3 + b^3 = ________________ \\
   a^3 - b^3 = ________________
   \]

**For additional practice: Section 6.4 Exercises 9 – 73 odd**

**For Sections 6.1 – 6.4 Review, complete Piece It Together Exercises 1 – 20 on page 474.**
Section 6.5 Solving Quadratic Equations and Other Polynomial Equations by Factoring

28. A quadratic equation is an equation that can be written in the form __________________________, where $a$, $b$, and $c$ are real numbers and $a \neq 0$. This form is called the ___________________ form. (6.5, Obj. 1)

29. The Zero Products Property states that if $a \cdot b = 0$, then _____________ or _______________. (6.5, Obj. 1)

30. To solve a quadratic equation by factoring, (6.5, Obj. 1)
   a. Write the equation in __________________ form, if necessary.
   b. ____________ the resulting polynomial.
   c. Use the _______________ ________________ property to solve the equation.
   d. ____________ the solutions in the original equation.

31. The degree of a polynomial equation determines the maximum number of ________________ of the equation. (6.5, Obj. 1)

32. To solve a polynomial equation with degree 3 or higher, (6.5, Obj. 2)
   a. Write the equation in _________________ form; that is, “polynomial = 0.”
   b. _______________ the polynomial.
   c. Apply the _______________ ________________ property and set each ______________ equal to ___________.
   d. _______________ the resulting equations.
   e. _______________ each solution in the original equation.

**For additional practice: Section 6.5 Exercises 7 – 83 every other odd**

Section 6.6 Applications of Quadratic Equations

33. To solve a word problem, (6.6, Obj. 1)
   a. ____________ the question carefully to determine what is ________________ and what is ________________. Assign a variable to the ________________, as needed. Make note of any _______________ that apply and draw a _______________ of the situation, if possible.
   b. _______________ the words into a mathematical equation.
   c. _______________ the equation.
   d. _______________ the answer.
   e. _______________ the original question and make sure the answer is ________________ in the context of the problem.

**For additional practice: Section 6.6 Exercises 5 – 10 **

Chapter 6 Review Materials

- See Chapter 6 Summary on pages 497 - 498.
- Chapter 6 Review Exercises 1 - 67
- Chapter 6 Test Exercises 1 – 30
Answers

1. coefficient; degree; constant
2. sum; \( ax^n \); descending
3. largest; leading coefficient
4. parentheses; like; like; standard
5. opposite; like; standard; \( P + (-Q) \)
6. distribute; coefficients; adding
7. each term; each term; products; like; standard
8. FOIL; first, outer, inner, last
9. \( a^2 + 2ab + b^2 \); \( a^2 - 2ab + b^2 \)
10. conjugates
11. \( a^2 - b^2 \); difference; squares
12. numerator; denominator; \( \frac{A}{C} + \frac{B}{C} \)
13. largest; factor
14. prime
15. smallest
16. coefficients; variables; product; coefficients; variable
17. GCF; distributive; multiplying
18. four
19. pairs; GCF; binomial; multiplying
20. factors; sum; factors; signs; sum; binomials; multiplying
21. common
22. common; first; last; signs; product; multiplying
23. a. common; b. leading, constant, \( a \cdot c \); c. sum; d. middle, sum; e. grouping; f. multiplying
24. perfect square
25. \( (a - b)(a + b) \)
26. cannot; common
27. \( (a + b)(a^2 - ab + b^2); (a - b)(a^2 + ab + b^2) \)
28. \( ax^2 + bx + c = 0 \); standard
29. \( a = 0; b = 0 \)
30. a. standard; b. Factor; c. zero products; d. Check
31. solutions
32. a. standard; b. Factor; c. zero products, factor; d. Solve; e. Check
33. a. Read, known, unknown, unknown, formulas, picture; b. Translate; c. Solve; d. Write; e. Check, reasonable