

Mid-term Study Guide and Review

Text: Algebra Structure and Method * Book 1
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CHAPTER 4: Polynomials

- 4.1 Addition and Subtraction with Exponents
- 4.2 Adding and Subtracting Polynomials
- 4.3 Multiplying Monomials
- 4.4 Powers of Monomials (Powers of Powers)
- 4.5 Multiplying Polynomials by Monomials
- 4.6 Multiplying Polynomials by Polynomials
- 4.7 Transforming Formulas
- 4.8 Rate-Time-Distance Problems
- 4.9 Area Problems
- 4.10 Problems without Solutions

Vocabulary:

power (p. 141)

exponent (p. 141)

monomial (p. 146)

polynomial (p. 146)

trinomial (p. 146)

similar or like terms (p. 146)
146)

degree of a monomial (p. 146)

uniform motion (p. 167)

base (p. 141)

exponential form (p. 141)

constant (p. 146)

binomial (p. 146)

coefficient (p. 146)

polynomials in simplest form (p.

degree of a polynomial (p. 147)

Sample Problems:

1. Simplify each expression.

a. -3^2

b. $2 - 5^2$

c. $[2^2 \times 3^3 - 3 \times 2^4] \div [(2 \times 3)^2 - 2^4]$

d. $n - 2n^2 + 3n - n^3 - 3n^2 - n^2$

e. $pq^2 + 2p^2q + 3q^2p + 4qp^2 + p^2q^2$

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

h. $(5a^2b^3c)(2ab^4)$

i. $(3k^4)(4k^3) - (5k^2)(2k^5)$

j. $(xy)(x^{2y})$

k. $(5^x)(5^y)$

2. Evaluate each expression if $x = 3$ and $y = -4$

a. $yx + y^2$

b. $y(x-y)^2$

3. Solve

a. $(4y-3) - (4-y) = 3(y+3)$

b. $(3x + 5)(2x - 3) = (x-1)(6x + 5)$

4. Multiply and simplify.

a. $(x - 7)(x + 7)$

b. $(2a^2)^3$

c. $(3a^2b)^3(2a^3b)$

d. $3x(x^2 - 2x + 4)$

e. $3x(5 - 2x) + 6x(x - 2)$

f. $(x + 1)^2$

g. $(5k + 2)(2k - 3)$

h. $(a + 1)(a^2 + 3a + 5)$

i. $(x + 2)^3$

5. Solve for the indicated letter.

a. $y: a = \frac{b + y}{t}$

b. $h: z = 2a^2 - 4ah$

c. $B: x + 1 = n(x + B)$

d. $x: w = \frac{2x}{x - 5}$

6. Write an equation and solve:

a. A ski lift carried Sr. Carol up a slope at the rate of 6km/h, and she skied back down parallel to the lift at 34km/h. The round trip took 30 minutes. How far did she ski down the slope?

b. A rectangle is 10m longer than it is wide. If its length and width are both decreased by 2m, its area is decreased by 48 m². Find the original dimensions.

CHAPTER 5: Factoring Polynomials

5.1	Page 185	Factoring Integers
5.2	Page 189	Dividing Monomials
5.3	Page 194	Monomial Factors of Polynomials
5.4	Page 200	Multiplying Binomials Mentally
5.5	Page 204	Differences of Two Squares
5.6	Page 208	Squares of Binomials
5.7	Page 213	Factoring Pattern for $x^2 + bx + c$, when c is positive
5.8	Page 217	Factoring Pattern for $x^2 + bx + c$, when c is negative
5.9	Page 220	Factoring Pattern for $ax^2 + bx + c$
5.10	Page 224	Factoring by Grouping
5.11	Page 227	Using Several Methods of Factoring
5.12	Page 230	Solving Equations by Factoring
5.13	Page 234	Using Factoring to Solve Problems

Vocabulary:

factor(p. 185)
prime number (p. 185)
greatest common factor of two or more integers (p. 186)
divisible (p. 195)
quadratic term (p. 201)
linear term (p. 201)
perfect square trinomials (p. 209)
prime polynomial (p. 214)
converse (p. 230)
linear equation (p. 231)
cubic equation (p. 231)
equation

factor set (p.185)
prime factorization (p. 185)
greatest common factor of monomials (p. 190)
greatest monomial factor of a polynomial (p. 195)
quadratic polynomial (p.201)
irreducible polynomial (p. 214)
factor completely (p. 227)
polynomial equation (p. 231)
quadratic equation (p. 231)
standard form of polynomial (p.231)

Chapter 5 Sample Problems:

1. Find the prime factorization of the number given.

a. 270

2. Find the GCF of the given expressions.

a. $48r^5s^2, 84r^4s^6, 180r^2$

3. Find the missing factor.

a. $96x^7y^8 = (2x^2y)^3 (3y^3)(\quad)$

4. Simplify.

a. $\frac{51m^3n^7}{34m^5n^2}$

5. Divide.

a. $\frac{8s - 4}{4}$

b. $\frac{18x^3y - 12x^2y^3 + 6xy}{6xy}$

6. Factor

a. $2x^2 + 9x + 10$

b. $4t^2 - 100$

c. $w^2 + 49$

d. $r^3 - 2r^2 + 9r - 18$

e. $3w(w + 2) - 7(w + 2)$

f. $18xy^2 + 24x^2y - 42xyz$

g. $4z^2 - 2 - 7z$

h. $y^2 + 18y + 81$

i. $r^4 - 16s^4$

j. $2b^2 - 30b^2 + 88b$

k. $c^2 + cd + 40d^2$

l. $t^2 + 8t + 7$

7. Multiply

a. $(z + 4)(z - 5)$ _____

b. $(3c - 4)(2c + 7)$ _____

c. $(3d - 4)(3d + 4)$ _____

d. $(x - 9)^2$ _____

e. $x(x+2y^3)(4x - 3y^3)$ _____

8. Solve.

a. $x^3 - x^2 - 12x = 0$ _____

b. $u^4 - 14u^2 + 36 = 0$ _____

CHAPTER 6: Fractions

6.1	Page 247	Simplifying Algebraic Fractions
6.2	Page 251	Multiplying Algebraic Fractions
6.3	Page 255	Dividing Algebraic Fractions
6.4	Page 259	Least Common Denominators
6.5	Page 264	Adding and Subtracting Fractions
6.6	Page 270	Mixed Expressions
6.7	Page 274	Polynomial Long Division

Vocabulary:

least common denominator (LCD) (p.260)

mixed expression (p.270)

Steps in simplifying

1. Completely factor the numerator and denominator
- 2 Look for common factors to cancel (cross) out
3. Look for opposites - convert to equivalent expressions

General Cautions:

- Be careful when copying your work – double check signs and numbers and all factors
- Be careful factoring – check that your factors are correct by multiplying them and comparing to the polynomial you started with.
- Be alert to signs when you factor out a negative (-1) You may want to actually write (-1) so you don't forget it.

- Remember that to find restrictions on the denominator (no dividing by zero) – you have to go back to the completely factored denominator – BEFORE – you simplified it.

Sample Problems:

Simplify.

$$1. \frac{2ab + 2ac + 4a^2}{4b + 4c + 8a}$$

$$2. \frac{4b^2 - 5b - 6}{8b^2 + 6b}$$

$$3. \frac{10 - 3a - a^2}{a^2 - 4}$$

$$4. \frac{4a^2 - b^2 - 2a + b}{(2a + b)^2 - 1}$$

Express each product or quotient in simplest form.

You can cancel as you multiply – or multiply and cancel as you simplify

$$5. \frac{6a}{11b^4} \cdot \frac{22b}{3a^3}$$

$$6. \frac{3r - rt}{6r^2t} \cdot \frac{3}{9 - t^2}$$

$$7. \frac{4a^2 - b^2}{4c^2 - d^2} \cdot \left(\frac{2c - d}{2a + b} \right)^2$$

$$8. \frac{a^2 - (b - c)^2}{2a - 2b + 2c} \cdot \frac{6a - 6b + 6c}{b^2 - (a - c)^2}$$

$$9. \frac{2x-y}{2y-x} \div \frac{4x^2-y^2}{4y^2-x^2}$$

Remember order of operations: Multiplication and Division – which ever comes first in order from left to right. Work the first two fractions, then proceed with the third with the product of the first two.

$$10. \frac{b^2+6b-7}{6b^2-7b-20} \cdot \frac{2b^2+b-15}{b^2+2b-3} \div \frac{b^2+5b-14}{3b^2-2b-8}$$