

Unit 7 – Part 2

Notes, Class Work & Homework

- 7 – 5 : Polynomials
- 7 – 6 : Adding and Subtracting Polynomials
- 7 – 7: Multiplying Polynomials
- 7 – 8: Special Products of Binomials

Name _____

Class _____ Date _____

LESSON

Reteach

7-5 Polynomials

A **monomial** is a number, a variable, or a product of numbers and variables with whole-number exponents. A **polynomial** is a monomial or a sum or difference of monomials.

The degree of the monomial is the sum of the exponents in the monomial.

Find the degree of $8x^2y^3$.

$8x^2y^3$ The exponents are 2 and 3.

The degree of the monomial is $2 + 3 = 5$.

Find the degree of $-4a^6b$.

$-4a^6b$ The exponents are 6 and 1.

The degree of the monomial is $6 + 1 = 7$.

The degree of the polynomial is the degree of the term with the greatest degree.

Find the degree of $2x^4y^3 + 9x^5$.

$$\underbrace{2x^4y^3}_{7} + \underbrace{9x^5}_{5}$$

7 5 Degree of the polynomial is 7.

Find the degree of $4ab + 9a^3$.

$$\underbrace{4ab}_{2} + \underbrace{9a^3}_{3}$$

2 3 Degree of the polynomial is 3.

The **standard form** of a **polynomial** is written with the terms in order from the greatest degree to the least degree. The coefficient of the first term is the **leading coefficient**.

Write $5x + 6x^3 + 4 + 2x^4$ in standard form.

$$\underbrace{5x}_1 + \underbrace{6x^3}_3 + \underbrace{4}_0 + \underbrace{2x^4}_4$$

Find the degree of each term.

$$2x^4 + 6x^3 + 5x + 4$$

Write the terms in order of degree.

The leading coefficient is 2.

Find the degree of each monomial.

1. $7m^3n^5$

2. $6xyz$

3. $4x^2y^2$

Find the degree of each polynomial.

4. $x^5 + x^5y$

5. $4x^2y^3 + y^4 + 7$

6. $x^2 + xy + y$

Write each polynomial in standard form. Then give the leading coefficient.

7. $x^3 - 5x^4 - 6x^5$

8. $2x + 5x^2 - x^3$

9. $8x + 7x^2 - 1$



LESSON **Reteach**
7-5 **Polynomials (continued)**

Polynomials have special names based on their degree and the number of terms they have.

Degree	0	1	2	3	4	5	6 or more
Name	Constant	Linear	Quadratic	Cubic	Quartic	Quintic	6th degree ...

Terms	1	2	3	4 or more
Name	Monomial	Binomial	Trinomial	Polynomial

Classify $7x^4 + 5x + 3$ according to its degree and number of terms.

$7x^4 + 5x + 3$ is a quartic trinomial.

Degree: 4
Terms: 3

Polynomials can be evaluated.

A ball is thrown straight up in the air from a height of 4 feet at a speed of 65 feet per second. The height of the ball in feet is given by $-16t^2 + 65t + 4$ where t is the time in seconds. How high is the ball after 2 seconds?

Evaluate for $t = 2$.

$$-16t^2 + 65t + 4$$

$$-16(2)^2 + 65(2) + 4$$

$$-16(4) + 65(2) + 4$$

$$-64 + 130 + 4$$

$$70$$

Substitute 2 for t .

Follow the order of operations to simplify.

After 2 seconds, the ball is 70 feet high.

Classify each polynomial according to its degree and number of terms.

10. $7x^2 - 5x$

11. $b^3 + 2b^2 - 4b + 1$

12. A ball is thrown straight up in the air from a height of 6 feet at a speed of 80 feet per second. The height of the ball in feet is given by $-16t^2 + 80t + 6$ where t is the time in seconds. What is the height of the ball after 3 seconds?



Regents Algebra Accelerated
Degree, Standard Form, Leading
Coefficient and +/- Polynomials HW #1

Name _____

Date _____

Directions: State whether each of the following expressions is a monomial, binomial or trinomial.

1.) $4m^5n^4$ _____

2.) $3x^2 + 5x - 8$ _____

3.) $8x - 10y$ _____

4.) $3a + 5b - 7c$ _____

5.) $\frac{8x}{3y^2}$ _____

6.) $15x - 10z^3$ _____

Directions: A.) Write each of the following expressions in standard form.
B.) State the degree of each expressions.
C.) Name the leading coefficient of each expression.

7.) $16 + x^2$

8.) $6x - 18 + 3x^2 - 4x^3 + 7x^4$

A.) _____

A.) _____

B.) _____

B.) _____

C.) _____

C.) _____

8.) $1 - 5x^2 - 2x$

9.) $6x - 3 + 3x^3$

A.) _____

A.) _____

B.) _____

B.) _____

C.) _____

C.) _____

Directions: Classify each of the following as a constant, linear polynomial or a quadratic polynomial.

10.) $5x + 7$ _____

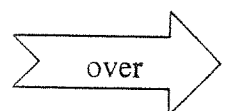
11.) -233 _____

12.) $3x + 6 + 2x^2$ _____

13.) $8 - 15x$ _____

14.) $x^2 - x + 6$ _____

3



LESSON
7-5 **Practice B**
Polynomials

Find the degree and number of terms of each polynomial.

1. $14h^3 + 2h + 10$

2. $7y - 10y^2$

3. $2a^2 - 5a + 34 - 6a^4$

Write each polynomial in standard form. Then, give the leading coefficient.

4. $3x^2 - 2 + 4x^8 - x$

5. $7 + 50j - 3j^3 - 4j^2$

6. $6k + 5k^4 - 4k^3 + 3k^2$

Classify each polynomial by its degree and number of terms.

7. $-5t^2 + 10$

8. $8w + 32 + 9w^4$

9. $b - b^3 - 2b^2 + 5b^4$

Evaluate each polynomial for the given value.

10. $3m + 8 - 2m^3$ for $m = -1$

11. $4y^5 - 6y + 8y^2 - 1$ for $y = -1$

12. $2w + w^3 - \frac{1}{2}w^2$ for $w = 2$

13. An egg is thrown off the top of a building. Its height in meters above the ground can be approximated by the polynomial $300 + 2t - 4.9t^2$, where t is the time since it was thrown in seconds.

a. How high is the egg above the ground after 5 seconds?

b. How high is the egg above the ground after 6 seconds?



LESSON
7-5 **Challenge**
Pick the Polynomial

Match each polynomial with the correct clue. Each polynomial can be used only once. Not every polynomial will be used.

Use these polynomials for 1 – 7.

$x^5 + x^3 + x$	$2x^4 y^4 + 3x^2 y^5$
$2x^4$	$x^5 y - 3x^2 y + xy$
$3x + 3y + 3z$	$-3xy^4$
$2xy + 5xy$	$2x^2 y + 5xy^2$
$4x^2 - 3x^5 + x$	$4xyz^2 + xyz$

1. I am a monomial with degree 5. Who am I?

2. I am a sum of monomials with degree 8. Who am I?

3. I am a trinomial with degree 5. Who am I?

4. I am a binomial. Both of my terms have degree 2. Who am I?

5. I am a monomial with degree 4. Who am I?

6. I am a binomial with degree 4. Who am I?

7. I am a trinomial. When you put me in standard form, my leading coefficient is -3 . Who am I?

Use these polynomials for 8 – 14.

$4xy + 3x^2 y$	$x^3 + x^2 + x$
$x^2 + x - 3$	$x^4 + x^3 + x^2$
$-3 + x + 4x^2$	$2x^2 - 3x^3 + 1$
$x^3 y - 3xyz + z$	$x - 3$
$-x + 3$	$x^2 + y^2 + z^2 + w^2$

8. I am a linear expression. My constant is -3 . Who am I?

9. I am a quartic trinomial. I have three different variables. Who am I?

10. I am a cubic binomial. Who am I?

11. I am a quadratic polynomial. I have no constants. Who am I?

12. I am a cubic trinomial with one variable. Who am I?

13. I am a quadratic trinomial. When you put me in standard form, my leading coefficient is 4. Who am I?

14. I am a quartic trinomial. Who am I?

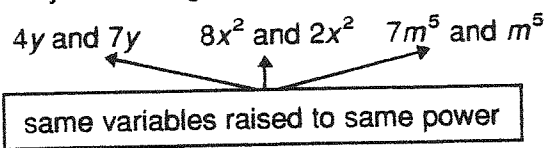
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LESSON
7-6

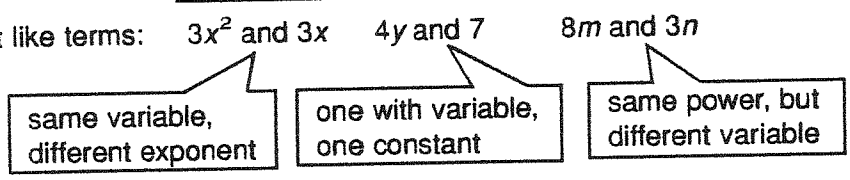
Reteach
Adding and Subtracting Polynomials

You can add or subtract polynomials by combining like terms.

The following are like terms:



The following are not like terms:



Add $3x^2 + 4x + 5x^2 + 6x$.

$$\begin{aligned} & \underline{3x^2} + \underline{4x} + \underline{5x^2} + \underline{6x} \\ & \underline{3x^2} + \underline{5x^2} + \underline{4x} + \underline{6x} \\ & 8x^2 + 10x \end{aligned}$$

Identify like terms.
Rearrange terms so that like terms are together.
Combine like terms.

Add $(5y^2 + 7y + 2) + (4y^2 + y + 8)$.

$$\begin{aligned} & (\underline{5y^2} + \underline{7y} + \underline{2}) + (\underline{4y^2} + \underline{y} + \underline{8}) \\ & (\underline{5y^2} + \underline{4y^2}) + (\underline{7y} + \underline{y}) + (\underline{2} + \underline{8}) \\ & 9y^2 + 8y + 10 \end{aligned}$$

Identify like terms.
Rearrange terms so that like terms are together.
Combine like terms.

Determine whether the following are like terms. Explain.

1. $4x$ and x^4 _____
2. $5y$ and $7y$ _____
3. $2z^3$ and $4x^3$ _____

Add.

4. $2y^2 + 3y + 7y + y^2$ 5. $8m^4 + 3m - 4m^4$ 6. $12x^5 + 10x^4 + 8x^4$

7. $(6x^2 + 3x) + (2x^2 + 6x)$ _____

8. $(m^2 - 10m + 5) + (8m + 2)$ _____

9. $(6x^3 + 5x) + (4x^3 + x^2 - 2x + 9)$ _____

10. $(2y^5 - 6y^3 + 1) + (y^5 + 8y^4 - 2y^3 - 1)$ _____

6 3

LESSON

Reteach

7-6 Adding and Subtracting Polynomials (continued)

To subtract polynomials you must remember to add the opposite.

Find the opposite of $(5m^3 - m + 4)$.

$$(5m^3 - m + 4)$$

$$-(5m^3 - m + 4) \quad \text{Write the opposite of the polynomial.}$$

$$-5m^3 + m - 4 \quad \text{Write the opposite of each term in the polynomial.}$$

Subtract $(4x^3 + x^2 + 7) - (2x^3)$.

$$(4x^3 + x^2 + 7) - (2x^3)$$

$$(4x^3 + x^2 + 7) + (-2x^3) \quad \text{Rewrite subtraction as addition of the opposite.}$$

$$(4x^3 + x^2 + 7) + (-2x^3) \quad \text{Identify like terms.}$$

$$(4x^3 - 2x^3) + x^2 + 7 \quad \text{Rearrange terms so that like terms are together.}$$

$$2x^3 + x^2 + 7 \quad \text{Combine like terms.}$$

Subtract $(6y^4 + 3y^2 - 7) - (2y^4 - y^2 + 5)$.

$$(6y^4 + 3y^2 - 7) - (2y^4 - y^2 + 5)$$

$$(6y^4 + 3y^2 - 7) + (-2y^4 + y^2 - 5) \quad \text{Rewrite subtraction as addition of the opposite.}$$

$$(6y^4 + 3y^2 - 7) + (-2y^4 + y^2 - 5) \quad \text{Identify like terms.}$$

$$(6y^4 - 2y^4) + (3y^2 + y^2) + (-7 - 5) \quad \text{Rearrange terms so that like terms are together.}$$

$$4y^4 + 4y^2 - 12 \quad \text{Combine like terms.}$$

Find the opposite of each polynomial.

11. $x^2 + 7x$

12. $-3x^3 + 4x - 8$

13. $-5x^4 + x^3 - 7x^2 - 3$

Subtract.

14. $(9x^3 - 5x) - (3x)$

15. $(6t^4 + 3) - (-2t^4 + 2)$

16. $(2x^3 + 4x - 2) - (4x^3 - 6)$

17. $(t^3 - 2t) - (t^2 + 2t + 6)$

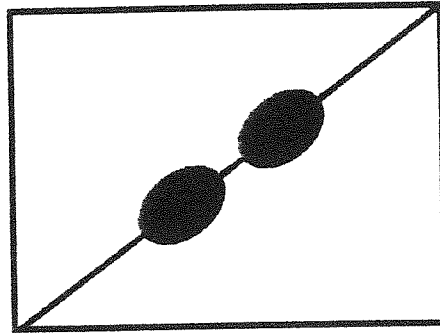
18. $(4c^5 + 8c^2 - 2c - 2) - (c^3 - 2c + 5)$



Add/Subtract Polynomials

Name _____

Directions: Solve each problem and find its corresponding answer letter in the table at the end. Use the letters to determine the title of this "doodle". Be sure to show all work.



5 4 10 3 5 2 12 1 10 7 2 6 8

9 8 5 3 2 6 12 4 11 6 12 7 5 4 4 8 4

____ 1. $(-3x^2 + 2x - 10) + (4x^2 - 3x + 2)$

____ 2. $(6x^2 - 8x) - (-2x^2 + 3x - 6)$

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

____ 4. $(5x^2 - 3x + 2) + (4x^2 - x + 6) + (-2x^2 + 7x - 12)$

____ 5. $(8x^2 + 3x + 1) - (4x^2 + 5x + 7) + (-3x^2 - x + 2)$

_____ 6. $(7x^2 - 8x - 2) + (3x^2 - 6x + 5) + (-2x^2 + 5x + 1)$

_____ 7. $(-2x^2 - 4x + 4) + (-7x^2 - 3x - 1) - (3x^2 - 3x - 8)$

_____ 8. $(-5x^2 - 5x - 6) - (2x^2 + 6x + 2) - (2x^2 + 4x + 9)$

_____ 9. Subtract $2x^2 + 3x + 5$ from $6x^2 - 5x + 3$.

_____ 10. From the sum of $4x^2 - 2x + 6$ and $2x^2 + 4x - 1$, subtract $5x^2 + 2x - 4$.

_____ 11. Express the perimeter of a rectangle with length $3x^2 - 4x - 7$ and width $x^2 + 3x + 8$.

_____ 12. Express the perimeter of a square whose side is $x^2 + 2x - 2$.

Answer Table:

A	$x^2 - 3x - 4$	B	$8x^2 - 11x - 6$	E	$-9x^2 - 15x - 17$	G	$4x^2 + 8x - 8$
H	$x^2 - x - 8$	I	$8x^2 - 11x + 6$	K	$-9x^2 + 5 + 5$	L	$-12x^2 - 4x + 11$
M	$x^2 - 9$	N	$8x^2 - 9x + 4$	P	$4x^2 - 2x + 8$	Q	$-12x^2 - 10x - 5$
R	$-x^2 + 5x + 9$	S	$7x^2 + 3x - 4$	T	$x^2 + 9$	U	$8x^2 - 2x + 2$
V	$7x^2 + 6x + 12$	W	$4x^2 - 8x - 2$	X	$-x^2 - 7x - 7$	Y	$-2x^2 - 4x - 11$

LESSON 7-6 Practice A
Adding and Subtracting Polynomials

Add or subtract.

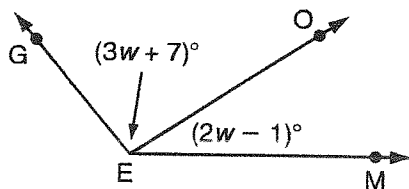
1. $3x^3 + 4 + x^3 - 10$ _____
 2. $6 - 12p^5 - 3p + 8 - 8p^5$ _____

Add.

3. $\begin{array}{r} 2m + 4 \\ + m + 2 \\ \hline \end{array}$ _____
4. $\begin{array}{r} 3y^2 - y + 3 \\ + 2y^2 + 2y + 9 \\ \hline \end{array}$ _____
5. $\begin{array}{r} 4z^3 + 3z^2 + 8 \\ + 2z^3 + z^2 - 3 \\ \hline \end{array}$ _____
6. $(10g^2 + 3g - 10) + (2g^2 + g + 9)$ _____
7. $(4x^3 - x^2 + 2x) + (3x^3 + x^2 + 4x)$ _____

Subtract.

8. $\begin{array}{r} 12k + 3 \\ - (4k + 2) \\ \hline \end{array}$ _____
9. $\begin{array}{r} 6s^3 + 9s + 10 \\ - (3s^3 + 4s - 10) \\ \hline \end{array}$ _____
10. $\begin{array}{r} 15a^4 + 6a^2 + a \\ - (6a^4 - 2a^2 + a) \\ \hline \end{array}$ _____
11. $(11b^2 + 3b - 1) - (2b^2 + 2b + 8)$ _____
12. $(c^3 - c^2 + 2c) - (-3c^3 - c^2 - 4c)$ _____
13. Write a polynomial that represents the difference between the measures of angle GEO and angle OEM.

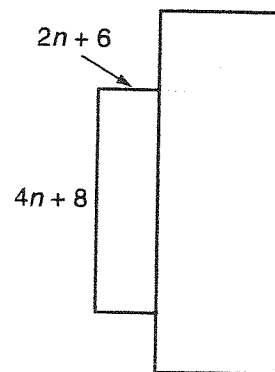


14. Becki is building an enclosure for her rabbits against the side of her house.

- a. Find the difference between the length and the width of the enclosure.

- b. Find the perimeter of the enclosure not including the side of the house.

- c. Find the perimeter of the enclosure if she built it in the yard with out the house as a wall.



Adding Polynomials

Name _____

Add or subtract the following polynomial expressions.

1. $(-3x^2 + 5x - 19) + (4x^2 - 2x)$

2. $(3a^2 - 4a) - (-2a^2 + 5a - 8)$

3. $(x^4 + x^3 + 6) - (4x^3 - 3x - 1)$

4. $(2y^2 + 3y + 6) + (3y^2 + 4y - 1) + (-2y^2 - 4y - 6)$

5. $(5x^2 + 12x - 4) - (2x^2 + x - 3) + (3x^2 - 6x - 4)$

6. $(3x^2 - 5x - 4) + (x^3 - 7x^2 - 5) + (-x^2 + 4x - 2)$

7. $(-a^2 + 5a^3 + 1) + (-4a^3 - 2a + 3) - (-a^3 + 2a^2 + 7)$

8. $(-2x^3 - x^2 - 10) - (4x^3 - 7x - 9) - (3x^3 - 2x^2 - 8)$



100%

9. Subtract $2y^2 + 5y + 8$ from $6y^2 - 2y + 3$.
10. From the sum of $2x^2 - 3x - 1$ and $x^2 + 5x$, subtract $5x^2 + 2x + 6$.
11. Subtract $4x^4 + 2x^2 + 5$ from the sum of $2x^4 - 4x^2 - 3$ and $3x^4 - 3x^2 + 9$.
12. Write the polynomial which represents the perimeter of a triangle whose sides are represented by $2x^2 + 3x$, $5x^2 - 1$, and $3x^2 + 7x - 1$.
13. Represent the perimeter of a square whose side is $4x^2 + 3x - 1$.
14. Express the perimeter of a rectangular pasture whose length is $3x^2 - 2x + 1$ and whose width is $x^2 - 3x - 6$.



LESSON **7-7** **Reteach**
Multiplying Polynomials

To multiply monomials, multiply the constants, then multiply variables with the same base.

Multiply $(3a^2b)(4ab^3)$.

$$(3a^2b)(4ab^3)$$

$$(3 \cdot 4)(a^2 \cdot a)(b \cdot b^3)$$

Rearrange so that the constants and the variables with the same bases are together.

$$12a^3b^4$$

Multiply.

To multiply a polynomial by a monomial, distribute the monomial to each term in the polynomial.

Multiply $2x(x^2 + 3x + 7)$.

$$2x(x^2 + 3x + 7)$$

$$(2x)x^2 + (2x)3x + (2x)7$$

Distribute.

$$2x^3 + 6x^2 + 14x$$

Multiply.

Multiply.

1. $(-5x^2y^3)(2xy)$

2. $(2xyz)(-4x^2yz)$

3. $(3x)(x^2y^3)$

Fill in the blanks below. Then finish multiplying.

4. $4(x - 5)$

$$(\square)x - (\square)5$$

5. $3x(x + 8)$

$$(\square)x + (\square)8$$

6. $2x(x^2 - 6x + 3)$

$$(\square)x^2 - (\square)6x + (\square)3$$

Multiply.

7. $5(x + 9)$

8. $-4x(x^2 + 8)$

9. $3x^2(2x^2 + 5x + 4)$

10. $-3(5 - x^2 + 2)$

11. $(5a^3b)(2ab)$

12. $5y(-y^2 + 7y - 2)$

110

LESSON **7-7** **Reteach**
Multiplying Polynomials (continued)

Use the Distributive Property to multiply binomials and polynomials.

Multiply $(x + 3)(x - 7)$.

$$\begin{array}{l} (x + 3)(x - 7) \\ \downarrow \quad \searrow \\ x(x - 7) + 3(x - 7) \end{array}$$

Distribute each term of the first binomial.

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

$$x^2 - 7x + 3x - 21$$

Multiply.

$$x^2 - 4x - 21$$

Combine like terms.

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

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

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

Distribute each term of the first binomial.

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

Distribute again.

$$x^3 + 3x^2 + 4x + 5x^2 + 15x + 20$$

Multiply.

$$x^3 + 8x^2 + 19x + 20$$

Combine like terms.

Fill in the blanks below. Then finish multiplying.

13. $(x + 4)(x - 5)$

14. $(x - 2)(x + 8)$

15. $(x - 3)(x - 6)$

$$\square(x - 5) + \square(x - 5)$$

$$\square(x + 8) - \square(x + 8)$$

$$\square(x - 6) - \square(x - 6)$$

Multiply.

16. $(x - 2)(x - 3)$

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

18. $(x + 2)(x + 1)$

Fill in the blanks below. Then finish multiplying.

19. $(x + 3)(2x^2 + 4x + 8)$

20. $(x + 2)(6x^2 + 4x + 5)$

$$\square(2x^2 + 4x + 8) + \square(2x^2 + 4x + 8)$$

$$\square(6x^2 + 4x + 5) + \square(6x^2 + 4x + 5)$$

LESSON
7-7 **Practice A**
Multiplying Polynomials

Multiply.

1. $(4x)(5x)$

2. $(3x^2)(5x)$

3. $(6y^2)(3y^3)$

4. $3(5x + 7)$

5. $4x(2x^2 + 7x + 3)$

Fill in the blanks by multiplying the First, Inner, Outer, and Last terms. Then simplify.

6. $(x + 5)(x + 2)$

7. $(x + 4)(x - 3)$

_____ F _____ O _____ I _____ L

_____ F _____ O _____ I _____ L

Simplify: _____

Simplify: _____

Fill in the blanks below. Then simplify.

8. $(x + 3)(x^2 + 4x + 7) = x(x^2 + 4x + 7) + 3(x^2 + 4x + 7)$

Distribute: _____ + _____

Simplify: _____

9. $(2x - 1)(4x^3 - 3x^2 + 5) = 2x(4x^3 - 3x^2 + 5) + -1(4x^3 - 3x^2 + 5)$

Distribute: _____ + _____

Simplify: _____

10. The length of a rectangle is 5 inches greater than the width.

- a. Write an expression for the width of the rectangle. _____
- b. Write an expression for the length of the rectangle. _____
- c. Write a simplified expression for the area of the rectangle.
(Area = length \times width) _____
- d. Find the area of the rectangle when the width is 3 inches. _____
- e. Find the area of the rectangle when the length is 9 inches. _____

Multiplying Polynomials

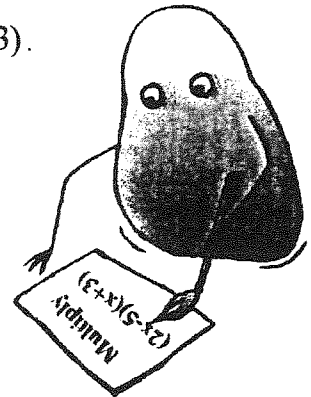
Name _____

Read each problem carefully.

1. Complete the chart below, and express the final product of $(2x - 5)(x + 3)$.

	$2x$	-5
x		
3		

$(2x - 5)(x + 3) = \underline{\hspace{4cm}}$



2. Given: polynomial $A = 2x^2 + 3x - 1$
 polynomial $B = 3x^2 - 2x + 5$

- Find the sum of polynomials A and B and label it S.
- Find the difference by subtracting polynomial B from polynomial A and label it D.
- Find the values of the four polynomials if $x = 3$ and $x = 5$.

Use your answers to complete the table below.

		$x = 3$	$x = 5$
Polynomial A	$2x^2 + 3x - 1$		
Polynomial B	$3x^2 - 2x + 5$		
Polynomial S			
Polynomial D			

- d. What do you observe about the numerical values of the polynomials in the table?

3. When a binomial is squared, the result is a trinomial. Complete the following patterns showing how a binomial sum and binomial difference are squared.

a.) $(\Delta + \square)^2 = \underline{\hspace{4cm}}$

b.) $(\square - \Delta)^2 = \underline{\hspace{4cm}}$

Multiply the following polynomials:

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

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

6. $(5y + 2)(3y - 4)$

7. $(3a + b)(3a + b)$

8. $(x + 2)(2 + x)$

9. $(4m - 2)(m + 5)$

10. $(-4x^4)(2x^2 + 4x + 6)$

11. $8a(2a^3 + 7a^2 + 5)$

12. $(2x + y)(x^2 + 5x + 2y)$

13. $(x - 2)(3x^2 - 4x - 5)$

LESSON
7-7 **Practice B**
Multiplying Polynomials

Multiply.

1. $(6m^4)(8m^2)$

2. $(5x^3)(4xy^2)$

3. $(10s^5t)(7st^4)$

4. $4(x^2 + 5x + 6)$

5. $2x(3x - 4)$

6. $7xy(3x^2 + 4y + 2)$

7. $(x + 3)(x + 4)$

8. $(x - 6)(x - 6)$

9. $(x - 2)(x - 5)$

10. $(2x + 5)(x + 6)$

11. $(m^2 + 3)(5m + n)$

12. $(a^2 + b^2)(a + b)$

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

14. $(3m + 4)(m^2 - 3m + 5)$

15. $(2x - 5)(4x^2 - 3x + 1)$

16. The length of a rectangle is 3 inches greater than the width.

a. Write a polynomial that represents the area of the rectangle.

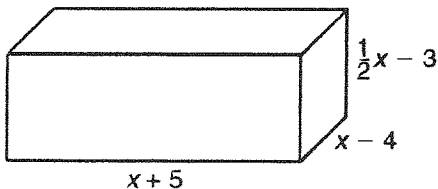
b. Find the area of the rectangle when the width is 4 inches.

17. The length of a rectangle is 8 centimeters less than 3 times the width.

a. Write a polynomial that represents the area of the rectangle.

b. Find the area of the rectangle when the width is 10 centimeters.

18. Write a polynomial to represent the volume of the rectangular prism.



LESSON **7-8** **Reteach**
Special Products of Binomials (continued)

When you multiply certain types of binomials, the middle term will be zero.

Multiply $(a + b)(a - b)$.

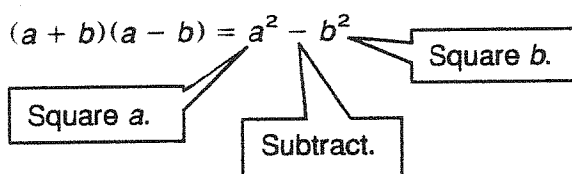
$$(a + b)(a - b)$$

$$a(a - b) + b(a - b) \quad \text{Distribute.}$$

$$a^2 - ab + ab - b^2$$

$$a^2 - b^2 \quad \text{Combine like terms.}$$

This type of special product is called a **difference of squares**.



Multiply $(x + 4)(x - 4)$.

$$(x + 4)(x - 4) \quad \begin{array}{l} a: x \\ b: 4 \end{array}$$

$$(x)^2 - (4)^2$$

$$x^2 - 16 \quad \text{Simplify.}$$

Multiply $(7 + 8x)(7 - 8x)$.

$$(7 + 8x)(7 - 8x) \quad \begin{array}{l} a: 7 \\ b: 8x \end{array}$$

$$(7)^2 - (8x)^2$$

$$49 - 64x^2 \quad \text{Simplify.}$$

State whether the products will form a difference of squares or a perfect-square trinomial.

10. $(x + 10)(x - 10)$

11. $(y + 6)(y + 6)$

12. $(z - 3)(z - 3)$

Fill in the blanks. Then write the difference of squares.

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

14. $(2 + m)(2 - m)$

15. $(2x + 5)(2x - 5)$

Square a : _____

Square a : _____

Square a : _____

Square b : _____

Square b : _____

Square b : _____

Multiply.

16. $(x + 8)(x - 8)$

17. $(10 + x)(10 - x)$

18. $(5x + 2y)(5x - 2y)$



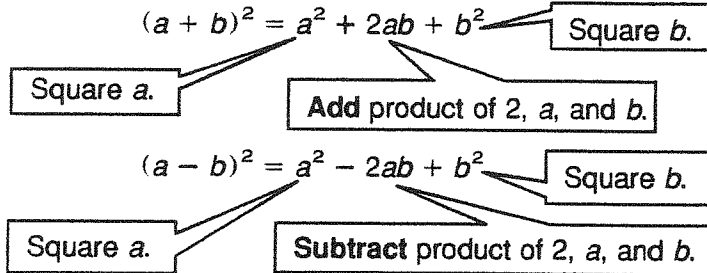
LESSON

7-8

Reteach

Special Products of Binomials

A perfect-square trinomial is a trinomial that is the result of squaring a binomial.



Multiply $(x + 4)^2$.

$$(x + 4)^2$$

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

$$x^2 + 8x + 16$$

a: x
b: 4
Middle term is added.
Simplify.

Multiply $(4x - 3)^2$.

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

$$16x^2 - 2(4x)(3) + 3^2$$

$$16x^2 - 24x + 9$$

a: 4x
b: 3
Middle term is subtracted.
Simplify.

State whether each product will result in a perfect-square trinomial.

1. $(x + 5)(x + 5)$

2. $(x + 2)(x - 2)$

3. $(5x - 6)(5x - 6)$

Fill in the blanks. Then write the perfect-square trinomial.

4. $(x + 7)^2$

Square a: _____

2(a)(b): _____

Square b: _____

5. $(x - 1)^2$

Square a: _____

2(a)(b): _____

Square b: _____

6. $(2x + 10)^2$

Square a: _____

2(a)(b): _____

Square b: _____

Multiply.

7. $(x - 8)^2$

8. $(x + 2)^2$

9. $(7x - 5)^2$

Regents Algebra 2/Geometry
Multiplication of Monomials and
Polynomials; Multiplication of Polynomials

Name _____

Date _____

I. Multiply and express the result in standard form.

#1.) $a^2b^3(5ab - 6a^3b^2)$

#2.) $(-y)(6y^2 + 5y)$

#3.) $-12(\frac{1}{4}a^2 - \frac{2}{3}b^2)$

#4.) $-b^2(6b^3 - 16b^2)$

#5.) $4x^2w^2(3x^2w^3 - 2xw^2 + w)$

#6.) $(x + 6)(x - 6)$

#7.) $(w + 3)(2w + 5)$

#8.) $(3w^2 - 9)(5w^2 - 1)$

#9.) $(6 - 5n)(6 + 5n)$

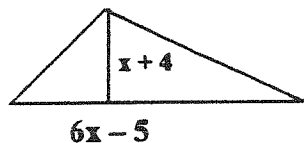
#10.) $(a + 8)^2$

#11.) $(6x + 5y)(5x + 2y)$

#12.) $(4b - 3)^2$

II. Find the area and express the result in standard form.

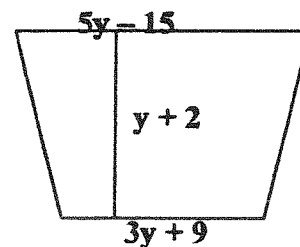
#13.)



#14.)

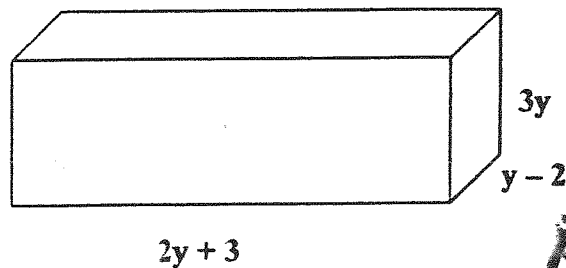


#15.)

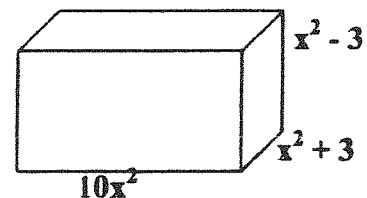


III. Find the volume and express the result in standard form.

#16.)



#17.)



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IV. Directions: Express the product of the following polynomials in standard form.

#18.) $(x - 4)(x^2 + 5x - 6)$

#19.) $(2x + 3)(x^2 - 4x + 3)$

#20.) $(5x + 2y)(4x^2 - xy - 3y^2)$

V. Directions: Answer each of the questions below.

#21.) Represent the volume of a rectangular solid whose length is represented by $(x - 3)$, width by $(x - 7)$, and height by $(x + 5)$.

#22.) Express the volume of a cube whose side is represented by $(3x + 1)$.

#23.) In the NBA Basketball Tournament there were $(k^2 + k + 2)$ games played. If there were $(2k - 3)$ players game on average, how many played in the tournament?

20

7-6 Adding and Subtracting Polynomials

Add or subtract.

30. $(-3y + 2) + (y^2 + 3y + 2)$ 31. $(2x^2 + 3x - 4) - (x^2 + x - 1)$

32. $(-2x^3 - x + 8) - (-2x^3 + 3x - 4)$

33. $(-4x^3 - 2x^2 + x - 5) + (2x^3 + 3x + 4)$

7-7 Multiplying Polynomials

Multiply.

34. $(3x - 7)(-2x)$ 35. $3x^2(5x - x^3 + 2)$ 36. $(3x - 2)(5x + 7)$

37. $(x - 5)(2x + 10)$ 38. $(x^2 + 9)(x^2 - x - 4)$ 39. $(2x^2 - 7x + 1)(4x + 3)$

7-8 Special Products of Binomials

Multiply.

40. $(2x + 1)^2$ 41. $(2 + 3y)^2$ 42. $(3y - 2)^2$

43. $(4x + 3y)^2$ 44. $(5x - 6)(5x + 6)$ 45. $(4x - 7y)(4x + 7y)$

46. The height traveled (in feet) of a bottle rocket is modeled by $h = -16t^2 + 57t$ where t is the time in seconds. Find the height of the rocket after 2 seconds.



for Polynomial Review

1. $(3x^2 + 6x - 5) + (4x + 3 - 2x^2)$

2. $(7x^3 + 3x - 5) - (4x^3 + 5x^2 + 4x)$

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

4. Subtract $x^2 - 2x - 5$ from $-5x^2 - 3x + 1$

5. $(2x - 4)(3x + 2)$

6. $-3x^2y^2z^3(4xyz + 3x^4y^4z^3)$

7. $(3x - 2)(4x^2 + 6x - 2)$

8.
$$\frac{21x^5 - 14x^4 - 28x^3}{7x^3}$$

9.
$$\frac{25a^6b^5c^4 - 15a^3b^4c^3 - 20a^2b^3c}{5a^2b^3c}$$

10. $(4x + 3)^2$

11. $(x - 2y)(3x - 4y)$

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

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2015

13. $(5a^2 - 2a + 7) + (4a - 2a^2 - 6)$

14. Subtract $3 - a^2$ from the sum of $a^2 - 2a + 1$ and $2a^2 - 3a + 6$

15. $\frac{x^{4b}}{x^b}$

16. $\frac{12x^5 + 4x^4 - 16x^3}{3x^2}$

17. $(4a + 2) - 3(8a - 3)$

18. $\frac{7^8}{7^3}$

19. $-2b(3b^2 + 13b - 7)$

20. $(x - 6)(x + 7)$

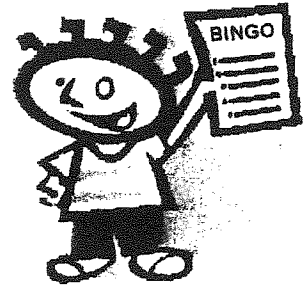
21. $6x + 2 - (x + 2 + 4x - 5)$

22. $(3a + b)(2a^2 + ab - 2b^2)$

23. $(5a - 3b)(2a^2 + b)$

24. $(2a + 5) - (a^2 + 2a + 3)$

Math Bingo



B	I	N	G	O

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Chapter 7 Skills Practice

Lesson 7-5

Find the degree of each monomial.

56. 4^7

57. x^3y

58. $\frac{r^6st^2}{2}$

59. 9^0

Find the degree of each polynomial.

60. $a^2b + b - 2^2$

61. $5x^4y^2 - y^5z^2$

62. $3g^4h + h^2 + 4j^6$

63. $4no^7 - o^6p^3 + p$

Write each polynomial in standard form. Then give the leading coefficient.

64. $4r - 5r^3 + 2r^2$

65. $-3b^2 + 7b^6 + 4 - b$

66. $\frac{1}{2}t^3 + t - \frac{1}{3}t^5 + 4$

Classify each polynomial according to its degree and number of terms.

67. $3x^2 + 4x - 5$

68. $-4x^2 + x^6 - 4 + x^3$

69. $x^3 - 7^2$

Lesson 7-6

Add or subtract.

70. $4y^3 - 2y + 3y^3$

71. $9k^2 + 5 - 10k^2 - 6$

72. $7 - 3n^2 + 4 + 2n^2$

73. $3a^2 + 4a^3 - 2a^2$

74. $(2 + x^2) + (5x^2 + 6)$

75. $(9x^6 - 5x^2 + 3) + (6x^2 - 5)$

76. $(2y^5 - 5y^2) + (3y^5 - y^3 + 2y^2)$

77. $(5y^3 - 6y + 2) + (2y^7 + y)$

78. $(r^3 + 2r + 1) - (2r^3 - 4)$

79. $(4r^4 - 3r^2 + 4) - (2r^4 - r^2)$

80. $(10s^2 + 5) - (5s^2 + 3s - 2)$

81. $(2s^7 - 6s^3 + 2) - (3s^7 + 2)$

Lesson 7-7

Multiply.

82. $(3a^7)(2a^4)$

83. $\left(\frac{3}{4}r^5\right)(12r^2)$

84. $(-3xy^3)(2x^2z)(yz^4)$

85. $(4kl^3m)(-2k^2m^2)$

86. $(-6c^2e)(-2de^2)$

87. $3jk^2(2j^2 + k)$

88. $4q^3r^2(2qr^2 + 3q)$

89. $-2c^3(c^3 + 3c - 2)$

90. $3xy^2(2x^2y - 3y)$

91. $(x - 3)(x + 1)$

92. $(x - 2)(x - 3)$

93. $(x - 4)(x - 4)$

94. $(2x^2 - 3y)(3x - y^2)$

95. $(x^2 + 2xy)(3x^2y - 2)$

96. $(x^2 - 3x)(2xy - 3y)$

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

98. $(2x - 1)(-2x^2 - 3x + 4)$

99. $(x + 3)(2x^4 - 3x^2 - 5)$

100. $(2a + 3)(a^2 + 2ab - b)$

101. $(3a + b)(2a^2 + ab - 2b^2)$

102. $(a^2 - b)(3a^2 - 2ab + 3b^2)$

Lesson 7-8

Multiply.

103. $(x + 3)^2$

104. $(3 + 2x)^2$

105. $(4x + 2y)^2$

106. $(3x - 2)^2$

107. $(5 - 2x)^2$

108. $(3x - 5y)^2$

109. $(3 + x)(3 - x)$

110. $(x - 5)(x + 5)$

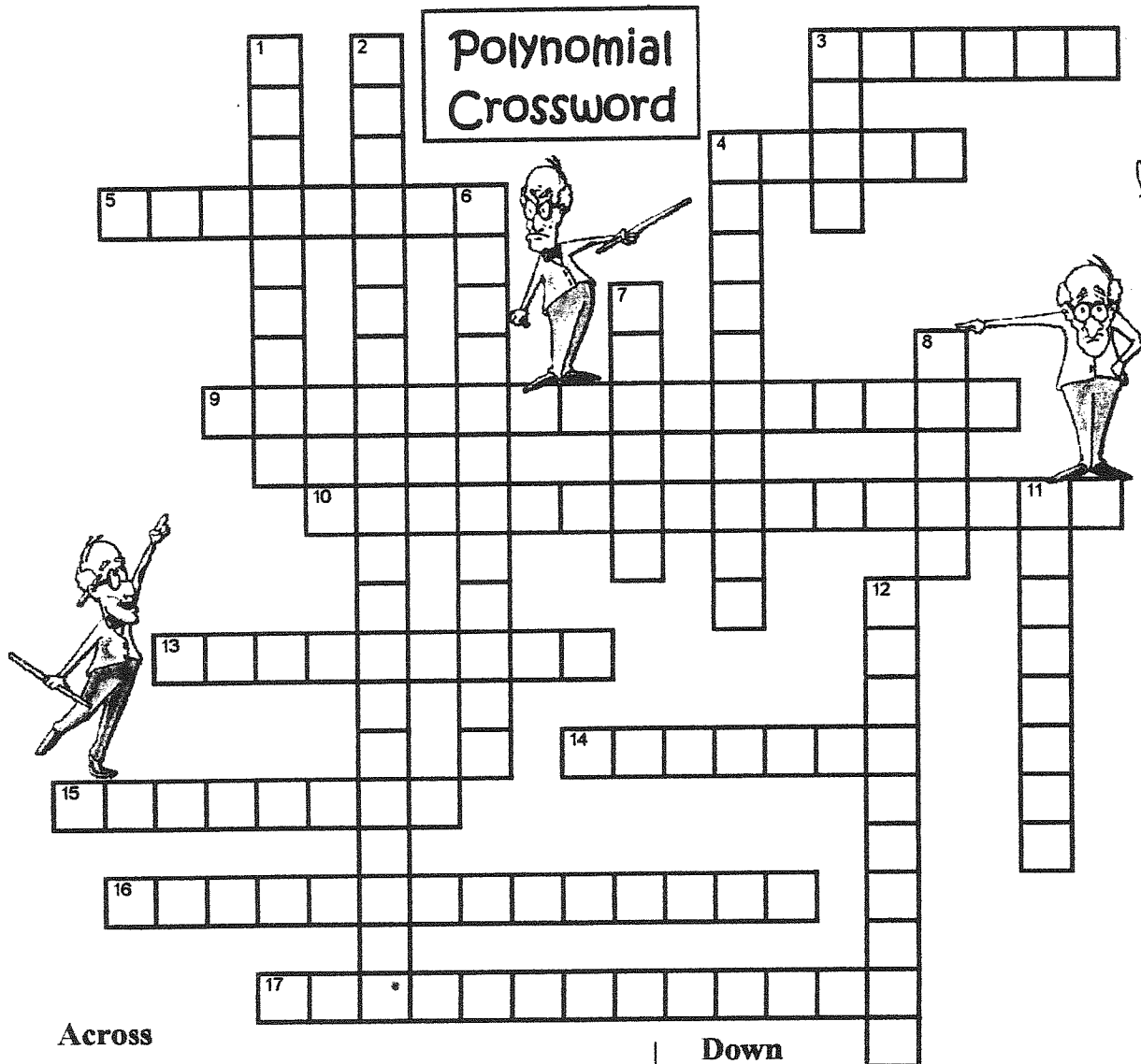
111. $(2x + 1)(2x - 1)$

112. $(x^2 + 4)(x^2 - 4)$

113. $(2 + 3x^3)(2 - 3x^3)$

114. $(4x^3 - 3y)(4x^3 + 3y)$

Polynomial Crossword



BONUS

Across

3. $2x^4 - 3x^2 + 6$ is said to be a polynomial of the ____ degree.
4. A number greater than 1 and only divisible by 1 and itself.
5. A polynomial written as $ax^2 + bx + c$ is said to be in ____ form.
9. A process used to factor $x^2 - 3x + 8x - 24$ (3 words).
10. To add/subtract terms that are similar (3 words).
13. The reverse process of multiplication of polynomials.
14. The answer when 2 or more polynomials are multiplied
15. A two-termed expression.
16. Another name for "Factor by Grouping" (3 words).
17. $x^2 - 10x + 25$ is a _____ (2 words).

Down

1. A polynomial with three terms.
2. The first step in factoring $8x^3 - 32x$ is to find the _____ (3 words).
3. An acronym used when multiplying two binomials.
4. A monomial, or the sum of two or more monomials.
6. $3x(x - 4) = 3x^2 - 12x$ is an example of the ____ property.
7. The sum of the exponents of the variables of a monomial.
8. The third word in FOIL.
11. A polynomial with only one term.
12. A process used to break down a number into its prime factors (2 words).