

Unit 1, Part 1 – Linear Functions

Algebra 1

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8 Graphing Systems Inequalities	9 Review	10 Independent Workday TEST	11 GCF Grouping	12 Factoring

Expressions/Polynomials – Parts, Standard Form, Classifying

Terms: _____

Variables: _____

Coefficients: _____

Constants: _____

Like Terms: _____

Degree: _____

Examples:

1) $6x - 2y + x - 5$

2) $2c + b + 8a - 1$

Terms: _____

Terms: _____

Like Terms: _____

Like Terms: _____

Variables: _____

Variables: _____

Coefficients: _____

Coefficients: _____

Constants: _____

Constants: _____

★ **Standard Form of a Polynomial:** _____

_____ ★

Classifying Polynomials (Naming Polynomials)

By Degree		By Number of Terms	
Degree	Name	# of Terms	Name
0		1	
1		2	
2		3	
3		4 or more	
4			
5			
6 +			

Identifying Parts of Algebraic Expressions Practice

1) How many terms are in each of the following algebraic expressions?	Answers:
a) $6x^3 + 8x^2 - 4x$	
b) $15xy^3 + 21x^2 - 16$	
c) $19x^4 + 8x^2 + 4xy - 2$	
d) $8x^3 + 14x^5 - 20x^2 + 9x - 25$	
e) $9x^3y + 5x^4 - 24x^2 + 7x - 6x^6$	
f) $2ab + 7$	
g) $15xy + 7x + 2y + 9$	

2) Identify the coefficients, constants, and variables in each expression.	Coefficients	Constants	Variables
a) $81x^3 + 7xy^2 - 14x$			
b) $4x^3 + 8x^2 - 24$			
c) $61x^2 + 6x + 7$			
d) $4xyz^3 + 8x^2 - 2xy^2 + 29x - 46$			
e) $22a^3 + 38a^2 - 12b$			
f) $28a^2 - 17ab$			
g) $7x + 2xy$			

3) Identify the exponents in each expression.	Answers:
a) $12x^3y^2$	
b) $62x^4$	
c) $2x^2y$	
d) $125x^5$	
e) $9a^7$	
f) -12	
g) $-12ab^2c$	

4) List the like terms in each of the following algebraic expressions?	Answers:
a) $14xy^2 + 25x - 6x + 2$	
b) $8x^2 + 12x^2 - 9xy + 3x$	
c) $86x^3 + 42x - 36x^3 + 21y$	
d) $4x^2 + 6y - 6x + 7y$	
e) $36m^3 + 22m^2n^2 - 2m^2n^2 + 7m - 50$	

Standard Form and Classifying Polynomials Practice

	Standard Form	Classify by Degree	Classify by # of Terms
1) $-2x^2 - 3x^5 + 7$			
2) 7			
3) $6x^4$			
4) $7x^2 - 2x^2$			
5) $-2 + 4x^4$			
6) $5x^5 + 3x^3 - 2 - 4x$			
7) $-6x^2 + 9x^2$			
8) $-2x^3$			
9) $7 - 8x + 4x^3$			
10) $7x^2$			
11) $5 + 9x^3 + 3x^3$			
12) $-5 + x$			
13) $-8x^4 - 8x$			
14) $3x - 5x^2 - 2$			
15) $3x^3 + x$			

Adding and Subtracting Polynomials

Adding Polynomials:

$$(4x^2 + 8x - 9) + (-2x^2 + 11)$$

Subtracting Polynomials:

$$(4x^2 + 8x - 9) - (-2x^2 + 11)$$

Let $f(y) = 4y^3 + 5y - 2$, $g(y) = -5y + 12$, $h(y) = -y^2 + 7y - 1$, and $j(y) = 4y^2 + 6y + 5$.

Find the following:

1) $f(y) + h(y)$

2) $j(y) - f(y)$

3) $g(y) + f(y)$

4) $h(y) + j(y)$

More Examples:

1) Find the sum of $(2x^3 + 8x)$ and $(-7x^3 + 3x^2 + 11x)$.

2) Find the difference of $(8x^3 - 2x^2 + 14)$ and $(-y^3 + 4)$.

Adding and Subtracting Polynomials Practice

Simplify each expression.

1) $(2x^2 - 8x^4) - (4x^2 - 8)$

2) $(3 - 3b^4) + (8b^4 + 7b^2)$

3) $(4x^4 + 6x^3) + (6x^3 + 8x^4)$

4) $(6n^4 - 8) - (7 - 5n^4 - 7n^3)$

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

6) $(5x^3 + x) + (x - 3x^3 - 3)$

7) $(6x^4 - 4x + x^2) + (2x - 2x^2 - 8x^4)$

8) $(5a^4 + 7 - 6a) - (8 + 8a^3 + 2a^4)$

9) $(8x^4 - 8 - 5x) + (5 - 5x^3 - 2x^4)$

10) $(8 - 3x + 5x^3) + (8x^4 - 8x^3 - 6) - (8x + 3x^4 - 5)$

11) $(4a^4 + 4a^2 - 5a) + (2 + a^2 + a) - (6a - 5a^3 + 8a^4)$

Multiplying Polynomials

When multiplying polynomials, use the _____!!

Remember, when multiplying _____, you _____ the exponents.

$$x \cdot x = x^2 \cdot x^3$$

Examples:

1) $5(x + 6)$

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

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

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

5) $(x + 9)(x - 3)$

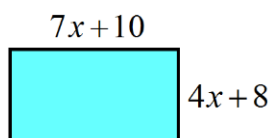
6) $(x + 3)(x - 3)$

7) $(2x + 5)(x + 6)$

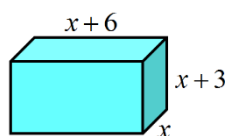
8) $(3x - 1)(2x - 4)$

9) $(5b - 6)(3b^2 - 2b + 5)$

10) Find the area of the rectangle below.



11) Find the volume of the following rectangular prism.



Multiplying Polynomials Practice

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

2) $(x + 4)(x - 6)$

3) $(x + 9)(x - 9)$

4) $(3x + 1)(2x - 5)$

5) $(6x - 3)(4x - 1)$

6) $(8x + 7)(2x + 3)$

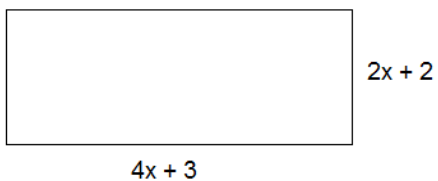
7) $(2x + 5)^2$

8) $(3x - 8)^2$

9) $(x + 5)(x^2 - 7x + 4)$

10) $(x - 3)(x^2 + 8x + 1)$

11) Write an expression for the perimeter and area of the following rectangle.



Perimeter:

Area:

Solving One-Step Equations

Make sure you show your work for each problem.

1) $y + 9 = 23$

2) $\frac{x}{4} = 16$

3) $78 + m = 100$

4) $3n = 39$

5) $a - 15 = 10$

6) $m - 56 = -10$

7) $8c = 96$

8) $\frac{g}{-7} = 3$

9) $x - 37 = 25$

10) $f - 65 = 185$

11) $11t = 143$

12) $r + 40 = 20$

Solving Two-Step Equations

Make sure you show your work for each problem.

1) $3y + 6 = 12$

2) $10 + 3v = 25$

3) $\frac{j}{3} + 5 = 9$

4) $2x + 8 = 16$

5) $8 = 5d - 12$

6) $\frac{n}{10} - 20 = 0$

7) $6 = \frac{m-9}{3}$

8) $4w - 6 = 10$

9) $9s - 40 = 41$

10) $14 = 2c + 10$

Solving Multi-Step Equations

Make sure you show your work for each problem.

1) $6a + 5a = -11$

2) $4x + 6 + 3 = 17$

3) $6r - 1 + 6r = 11$

4) $-10 = -14v + 12v$

5) $-6n - 2n = 16$

6) $0 = -5n - 2n$

7) $r + 11 + 8r = 29$

8) $-10p + 9p = 12$

9) $37 = -3 + 5(x + 6)$

10) $-(n - 8) = -2$

11) $8 = 8v - 4(v + 8)$

12) $8(1 + 5x) + 5 = 13 + 5x$

Solving Inequalities

When solving inequalities, follow the same steps that you would when solving equations. However, there are two things that you need to remember that are different.

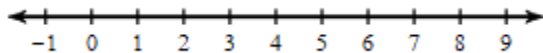
- ★ If you _____ BOTH sides of the inequality by a _____, you must _____ the inequality symbol
- ★ For your final answer, you want the _____ to be on the _____ of the inequality

Once you have your answer, you will also need to shade the number line appropriately.

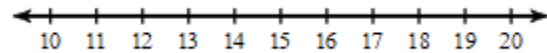
	Less Than	Greater Than
	Less Than or Equal To	Greater Than or Equal To

Make sure you show your work for each problem.

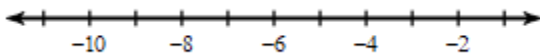
1) $4x > 4$



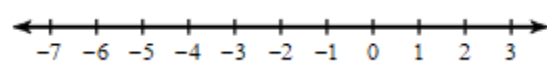
2) $n - 20 \geq -8$



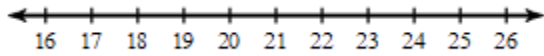
3) $9 \leq 6 - n$



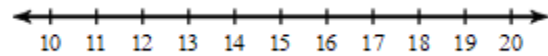
4) $-2 > 1 + p$



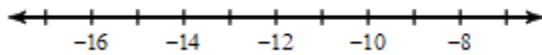
$$5) \frac{x+8}{26} \leq 1$$



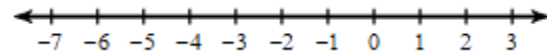
$$6) -44 \leq 1 - 3b$$



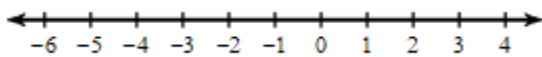
$$7) 6 \geq \frac{n}{7} + 8$$



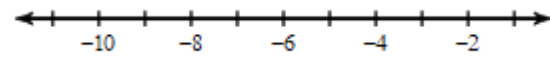
$$8) 5(6 + n) \leq 30$$



$$9) b + 3 + 4b < -7$$



$$10) 106 \leq -8 + 6(-4n - 1)$$



Solving Literal Equations

To solve a literal equation:

- 1) Locate the _____ that you want to solve for
- 2) Follow the rule for _____ to get the variable all by itself (isolated)

Examples:

Solve for x:

.....instructions for what to solve for

$$x + b = a$$

.....original equation

$$\begin{array}{r} \textcircled{x} + b = a \\ -b \quad -b \\ \hline \end{array}$$

.....locate what you are solving for
.....subtract "b" on both sides

$$\textcircled{x = a - b}$$

.....simplify the equation

Solve for d:

.....instructions for what to solve for

$$cd = 10$$

.....original equation

$$\frac{\textcircled{cd}}{c} = \frac{10}{c}$$

.....locate what you are solving for
.....divide both sides by "c"

$$\textcircled{d = \frac{10}{c}}$$

.....simplify the equation

Solve for a:

.....instructions for what to solve for

$$4a - b = c$$

.....original equation

$$\begin{array}{r} \textcircled{4a} - b = c \\ + b \quad + b \\ \hline \frac{4a}{4} = \frac{c + b}{4} \end{array}$$

.....locate what you are solving for
.....add "b" to both sides
.....simplify the equation
.....divide both sides by 4

$$\textcircled{a = \frac{c + b}{4}}$$

.....simplify the equation

Solving Literal Equations Practice

1) Solve for k .

$$k + 20 = t$$

2) Solve for v .

$$\frac{v}{5} = w$$

3) Solve for m .

$$2m - p = 11f$$

4) Solve for C .

$$F = \frac{9}{5}C + 32$$

5) Solve for b .

$$A = bh$$

6) Solve for L .

$$P = 2L + 2W$$

For questions 7-10, solve for y .

7) $2y = 4x + 10$

8) $19 = 7x + y$

9) $8y - 4x = 2$

10) $3y - 12x = 18$

Translating Words into Expressions, Equations, and Inequalities

Remember, the main difference between an expression and an equation is that

_____.

The difference between an equation and an inequality is that _____

_____.

Key Words

sum: _____

difference: _____

product: _____

quotient: _____

less than: _____

more than: _____

is: _____

equals: _____

twice: _____

double: _____

half: _____

triple: _____

quadruple: _____

no more than: _____

at least: _____

is less than: _____

Examples

Translate the following into algebraic expressions, equations, or inequalities.

1) The sum of 8 and t .

2) The difference of 32 and x .

3) Eight more than x .

4) 12 less than some number.

5) Arthur is 8 years younger than Janet.

5) The product of 7 and b is 63.

6) Twice as many points as Bob.

7) Henry is half the age of Sally.

8) Two more than the quotient of 5 and a . 8) Six less than twice a number is 4.

9) The product of 7 and a number is no more than 140.

Word Problems

Special Types

Consecutive Numbers

The sum of 4 consecutive integers is 441. Find the four integers.

Consecutive Even/Odd Integers

The sum of three consecutive odd integers is 333. Find the three integers.

Average

Jimmy's first five unit test grades were 90, 74, 82, 68, and 76. There are a total of 6 unit tests in Jimmy's science class this semester. Is it possible for Jimmy to have a test average of 82? If so, what would he need to make on his next test?

Perimeter

A length of a rectangle is 3 inches greater than the width. The rectangle has a perimeter of 46 inches. Find the length and the width.

Word Problems Practice

1) You are trying to save \$20 a week to buy a new CD player. During the last 4 weeks you have saved \$35, \$15, \$10, and \$12. How much do you need to save this week in order to average saving \$20 per week for the 5 weeks?

2) On an algebra test, the highest grade was 42 points higher than the lowest test grade. The sum of the two grades (the lowest and the highest grades) was 138. Find the lowest test grade.

3) When 6 is added to four times a number, the result is 50. Find the number.

4) The sum of three consecutive integers is 159. Find the three integers.

5) The width of a rectangle is 8 inches more than the length. The perimeter is 32. Find the length and width of the rectangle.

6) Five times the sum of a number and two is thirty-five. Find the number.

7) Twelve subtracted from three times a number is fifteen. Find the number.

8) Twice a number added to seven is thirteen. Find the number.