

Name: _____

Algebra 1

Summer Review Packet

Due The First Day of School

About Algebra 1:

Algebra 1 teaches students to think reason and communicate mathematically. Students use variables to determine solutions to real world problems. Skills gained in Algebra 1 provide students with a foundation for subsequent math courses. Students use a graphing calculator as an integral tool in analyzing data and modeling functions to represent real world applications. Students are expected to use calculators in class, on homework, during tests, during finals and most importantly during the STAAR exam. In May, all Algebra 1 students will be required to take and pass the STAAR Algebra 1 assessment.

Expectations for the Summer Packet:

The problems in this packet are designed to help you review topics that are important to your success in Algebra 1. All work must be shown for each problem. The problems should be done correctly, not just attempted.

The packet is due on the first day of school. During the first week of school concepts in the packet will be reviewed. The packet will be a test grade for the first quarter.

All work should be completed and ready to turn in on the first day of school.

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Operations with Fractions

Adding and Subtracting Fractions



Simplify. DO NOT USE A CALCULATOR FOR THIS SECTION. Show all steps (common denominators).

$$1. \left(-\frac{5}{4}\right) + \frac{12}{7} =$$

$$2. \left(-\frac{12}{7}\right) - \left(-\frac{11}{7}\right) =$$

$$3. \left(-\frac{3}{5}\right) + \frac{7}{4} =$$

$$4. \frac{2}{7} - \left(-\frac{1}{5}\right) =$$

$$5. \frac{1}{2} - \frac{8}{5} =$$

$$6. 4 - \left(-\frac{15}{8}\right) =$$

$$7. \frac{7}{5} - \frac{9}{5} =$$

$$8. \left(-\frac{2}{7}\right) + \left(-\frac{1}{8}\right) =$$

$$9. \left(-\frac{1}{2}\right) - \frac{2}{3} =$$

$$10. 1 + \left(-\frac{1}{3}\right) =$$

Multiplying and Dividing Fractions

Simplify. DO NOT USE A CALCULATOR FOR THIS SECTION. Show all steps (common denominators).

$$1. \left(\frac{19}{10}\right)\left(-\frac{1}{2}\right) =$$

$$2. \left(\frac{1}{9}\right)\left(-\frac{4}{3}\right) =$$

$$3. \left(-\frac{2}{5}\right)\left(\frac{3}{2}\right) =$$

$$4. -2\left(-\frac{1}{5}\right) =$$

$$5. \left(\frac{7}{5}\right)\left(-\frac{3}{5}\right) =$$

$$6. \left(-\frac{3}{5}\right)\left(\frac{1}{2}\right) =$$

$$7. \left(\frac{7}{5}\right)\left(-\frac{9}{5}\right) =$$

$$8. \frac{1}{2} \div -2 =$$

$$9. \frac{13}{8} \div \frac{-11}{6} =$$

$$10. -2 \div \frac{3}{2} =$$

$$11. \frac{1}{5} \div 5 =$$

$$12. \frac{-4}{9} \div \frac{-7}{9} =$$

$$13. \frac{1}{7} \div \frac{9}{20} =$$

$$14. \frac{1}{12} \div \frac{19}{22} =$$

Order of Operations

To avoid having different results for the same problem, mathematicians have agreed on an order of operation when simplifying expressions that contain multiple operations.

1. Perform any operation(s) inside grouping symbols (parentheses, brackets, above or below a fraction bar)
2. Simplify any terms with exponents or roots from left to right
3. Multiply or divide from left to right
4. Add or subtract from left to right



Simplify using order of operations.

1. $12 \cdot 5 + 6 \div 6 =$	2. $10(3 - 6^2) + 8 \div 2 =$
3. $32 \div [16 \div (8 \div 2)] =$	4. $180 \div [2 + (12 \div 3)] =$
5. $\frac{5 + [30 - (8 - 1)^2]}{11 - 2^2} =$	6. $5(14 - 39 \div 3) + 4\left(\frac{1}{4}\right) =$
7. $162 \div [6(7 - 4)^2] \div 3 =$	8. $\frac{1}{4}(3 \cdot 8) + 2(-12) =$
9. $\frac{3[10 - (27 \div 9)]}{4 - 7} =$	10. $[8 \cdot 2 - (3 + 9)] + [8 - 2 \cdot 3] =$

Rounding Numbers



Round each number to the tenths, hundredths, and thousandths place.

	TENTHS	HUNDREDTHS	THOUSANDTHS
36.9913			
17.1083			
15.9199			
0.6701			
34.9127			
18.9763			

Evaluating Expressions



1. Evaluate each expression if $a = 3$, $b = 2$, $c = 5$, $d = 1$, $e = 10$, and $f = 12$.

$e \div c =$	$\frac{f}{c-d} =$	$3e + f =$	$d * d * d * d =$
$\frac{c+e}{a+c+f} =$	$\frac{1}{2}f =$	$\frac{1}{2}c =$	$a \div b =$

$\frac{b * c * e}{a + b} =$	$b * e * e * e * e =$	$3b - 5a =$	$\frac{a}{c} + \frac{d}{e} =$
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2. Evaluate each expression if $a = 2$, $b = 4$, $c = 1$, $d = 5$, $e = 10$.

$\sqrt{e + d + c} =$	$d^a + c^e =$	$\frac{\sqrt{8e + 1}}{b^2 + 3} =$
$\sqrt{98 + \sqrt{b}} =$	$b^b =$	$3b + \sqrt{b + d} =$

Perfect Squares

List the first 20 perfect squares and their square roots.

$1 * 1 = 1$	$\sqrt{1} = 1$
$2 * 2 = 4$	$\sqrt{4} = 2$



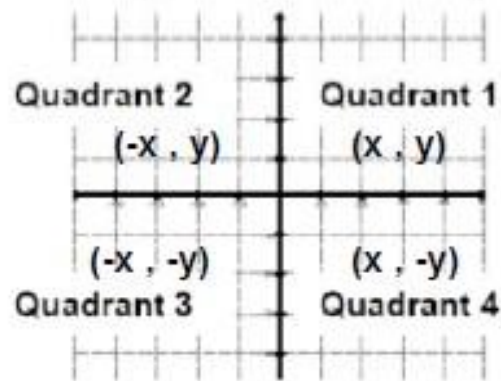
Finding the Factors of a Number

Find all the factors of each number, including 1 and itself.

24	36	72	-12
8	-6	5	15
45	27	34	51

Graphing

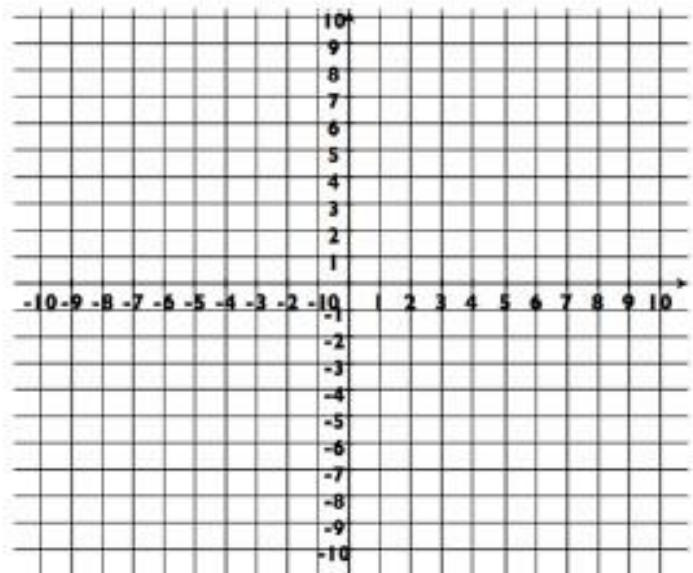
The x-y plane is divided into four quadrants (four sections) as described below.



Plot each function on the graph using the table of values.

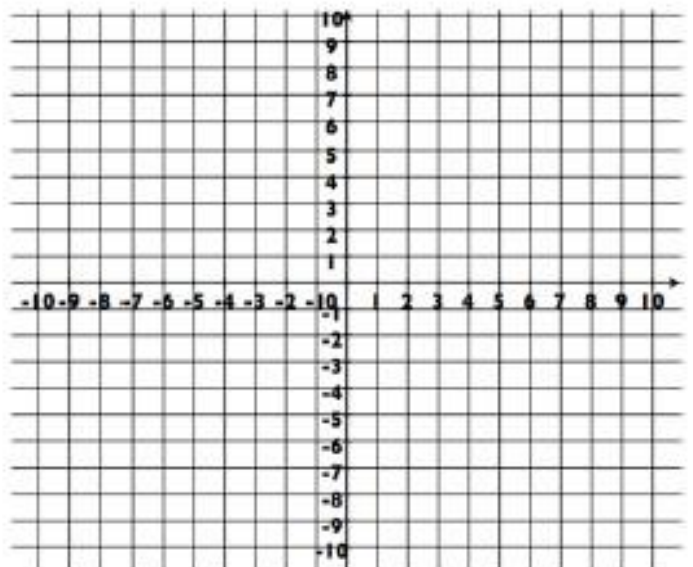
$$y = -\frac{2}{3}x + 8$$

x	y
-3	
-1	
0	
1	
3	



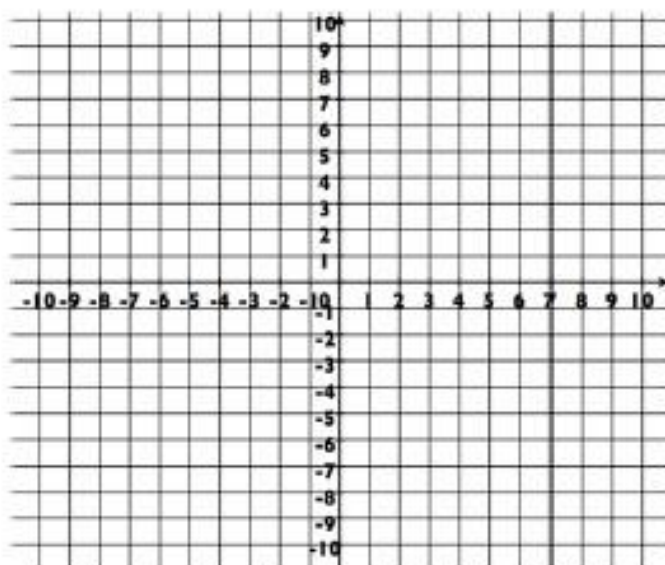
$$y = x^2 - 3$$

x	y
-4	
-2	
0	
2	
4	



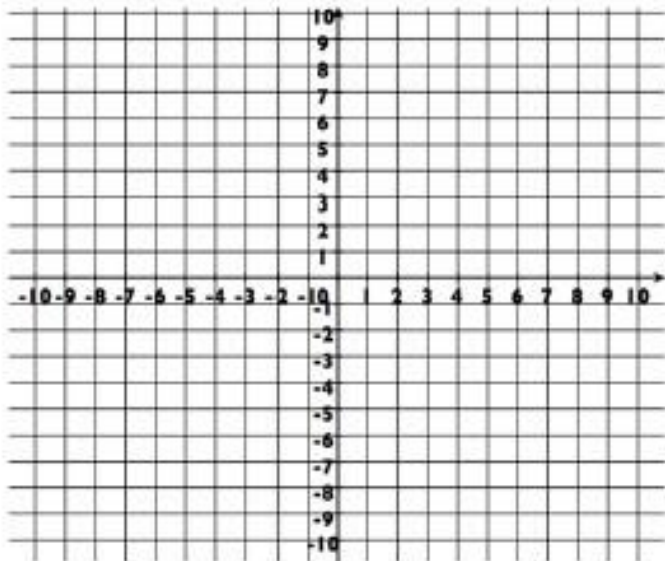
$$y = 2x - 5$$

x	y
0	
1	
2	
3	
4	



$$y = x + \frac{1}{2}$$

x	y
-4	
-2	
0	
2	
4	










Solving Equations

Solve each equation for the unknown.

1. $5 = 2x - 3$	2. $2m - 4 = 7$	3. $\frac{1}{2}x + 6 = 18$
4. $-2(s - 3) = -1$	5. $-(x + 4) = 2$	6. $2t + \frac{3}{4} = 1$

Solving Inequalities

Solve each inequality and graph the solutions on a number line.

1. $4x - 8 < 16$	2. $\frac{1}{2}n + 3 \geq 9$	
		
3. $3 - (4v + 6) > 9$	4. $18 \leq -9y$	
		

Word Problems

Key Words for Translations:

ADD	SUBTRACT	MULTIPLY	DIVIDE	INEQUALITIES	VARIABLE	=
Plus Sum Longer than Greater than Together Total Increased More than In all Add	Decreased Smaller Less than Difference Reduced Differ Fewer Shorter than Minus Diminished	Per For every For each Triple Multiplied Of Times Twice Double	One-third Quotient Divided by Each part Half as much Split equally	< is less than > is greater than \leq is less than or equal to \geq is greater than or equal to	A number Some number Quantity	Same as Equals Is Total Was Result Outcome Answer

Translate each word problem into algebraic equation, using x for the unknown, and solve.

Steps:

- Step 1:** Write a "let $x =$ " statement for each unknown
- Step 2:** Write an equation
- Step 3:** Solve the equation
- Step 4:** Substitute the value for x into the "let" statement(s) to answer the question

Solve each word problem using the methodology stated above.

1. A video store charges a one-time membership fee of \$12.00 plus \$1.50 per video rental. How many videos can Sarah rent if she spends \$21?



2. Bicycle City makes custom bicycles. They charge \$160 plus \$80 for each day that it takes to build the bike. If you have \$480 to spend on your new bicycle, how many days can it take Bicycle City to build your bike?
3. Jen weighs 20 pounds more than Anna. If the sum of their weights is 250 pounds, how much does each girl weigh?

LAWS OF EXPONENTS

BASE, EXPONENT, AND VALUE

In the expression 2^5 , 2 is the **base**, 5 is the **exponent**, and the **value** is 32.

$$2^5 \text{ means } 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 32$$

$$x^3 \text{ means } x \cdot x \cdot x$$

LAWS OF EXPONENTS

Here are the basic patterns with examples:

$$1) \quad x^a \cdot x^b = x^{a+b} \quad \text{examples: } x^3 \cdot x^4 = x^{3+4} = x^7$$

$$2) \quad \frac{x^a}{x^b} = x^{a-b} \quad \text{examples: } x^{10} \div x^4 = x^{10-4} = x^6$$

$$3) \quad (x^a)^b = x^{ab} \quad \text{examples: } (x^4)^3 = x^{4 \cdot 3} = x^{12}$$

$$4) \quad x^{-a} = \frac{1}{x^a} \text{ and } \frac{1}{x^{-b}} = x^b \quad \text{examples: } 3x^{-3}y^2 = \frac{3y^2}{x^3}; \quad \frac{2x^5}{y^{-2}} = 2x^5y^2$$

$$5) \quad x^0 = 1 \quad \text{examples: } 5^0 = 1$$

Example 1

$$\text{Simplify: } (2xy^3)(5x^2y^4)$$

$$\text{Multiply the coefficients: } 2 \cdot 5 \cdot xy^3 \cdot x^2y^4 = 10xy^3 \cdot x^2y^4$$

$$\text{Add the exponents of } x, \text{ then } y: 10x^{1+2}y^{3+4} = 10x^3y^7$$

Example 2

$$\text{Simplify: } \frac{14x^2y^{12}}{7x^5y^7}$$

$$\text{Divide the coefficients: } \frac{(14 \div 7)x^2y^{12}}{x^5y^7} = \frac{2x^2y^{12}}{x^5y^7}$$

$$\text{Subtract the exponents: } 2x^{2-5}y^{12-7} = 2x^{-3}y^5 = \frac{2y^5}{x^3}$$

Example 3

$$\text{Simplify: } (3x^2y^4)^3$$

$$\text{Cube each factor: } 3^3 \cdot (x^2)^3 \cdot (y^4)^3 = 27(x^2)^3(y^4)^3$$

$$\text{Multiply the exponents: } 27x^6y^{12}$$

Example 4

Simplify: $3x^{-4}y^2z^{-3} = \frac{3y^2}{x^4z^3}$

Simplify each expression:

1. $b^4 \cdot b^3 \cdot b^2$

2. $8^6 \cdot 8^2$

3. $\frac{m^8}{m^3}$

4. $\frac{15x^2y^7}{3x^4y^5}$

5. $(3a)^4$

6. $(\frac{4}{x^2})^3$

7. $\frac{(2a^7)(3a^2)}{6a^3}$

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

9. $\frac{(2x^5y^3)^3(4xy^4)^2}{8x^7y^{12}}$

10. $y^{-3}y^2$

11. $(4c^4)(ac^3)(3a^5c)$

12. $\frac{x^5}{x^{-2}}$