# 2024 Algebra 1 Symmer Packet

Name:	Score	//5
		/43

To get full credit, <u>you must show work</u>. Staple your work to the back of the packet when you turn it in. This is all review material from your previous math class. If you do not remember how to solve a problem, it is your responsibility to do some research and figure out how. These are all concepts that will be built upon in Algebra 1 and will continue to show up in future math courses as well.

Each student should be prepared to have the summer packet completed and ready to be checked during the first full day of school. Over the course of the first few weeks of the beginning of the school year, the packet will be reviewed, and a final packet assessment will be given as the first test grade of the new school year.

## Below are some helpful resources for you to refer to:

http://www.purplemath.com/modules/index.htm https://www.khanacademy.org/math/algebra I https://www.mathway.com/Algebra http://www.sosmath.com/ https://photomath.net/en/ http://www.livemath.com/ https://sites.google.com/a/epsne.org/mr-smith/how-to-study-math

# **Order of Operations**

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

- Perform any operation(s) inside grouping symbols. (Parentheses, brackets above or below a fraction bar)
- 2. Simplify any term with exponents.
- 3. Multiply and divide in order from left to right.
- 4. Add and subtract in order from left to right.

One easy way to remember the order of operations process is to remember the acronym PEMDAS or the old saying, "Please Excuse My Dear Aunt Sally."

- P Perform operations in grouping symbols
- E Simplify exponents
- 12 Perform multiplication and division in order from left to right
- D
- A Perform addition and subtraction in order from left to right
- S

## Example 1

## Example 2

$2 - 3^2 + (6 + 3 \times 2)$	$-7 + 4 + (2^3 - 8 \div -4)$
$2 - 3^2 + (6 + 6)$	$-7 + 4 + (8 - 8 \div -4)$
$2 - 3^2 + 12$	-7 + 4 + (82)
2 - 9 + 12	-7 + 4 + 10
-7 + 12	-3 + 10
= 5	= 7

## Order of Operations

1. $6 + 4 - 2 \cdot 3$	2. $(-2) \cdot 3 + 5 - 7$	3. $18 - 4^2 + 7$	$4. \ 16 \div 2 \cdot 5 \cdot 3 \div 6$
5. $32 \div [16 \div (8 \div 2)]$	6. $\frac{3[10-(27\div9)]}{4-7}$	7. $3(2+7) - 9 \cdot 7$	8. $10 \cdot (3 - 6^2) + 8 \div 2$

## **Operations with Signed Numbers**

#### Adding and Subtracting Signed Numbers

#### Adding Signed Numbers

Like Signs	Different Signs Subtract the numbers & carry the sign of the larger number	
Add the numbers & carry the sign		
(+)+(+)=+ (+3)+(+4)=+7	(+)+(-)=? (+3)+(-2)=+1	
(-)+(-)=- (-2)+(-3)=(-5)	(-)+(+)=? (-5)+(+3)=-2	

#### **Subtracting Signed Numbers**

Don't subtract! Change the problem to addition and change the sign of the second number. Then use the addition rules.

(+9)-(+12)=(+9)+(-12)	(+4)-(-3)=(+4)+(+3)
(-5)-(+3)=(-5)+(-3)	(-1)-(-5)=(-1)+(+5)

#### Multiplying and Dividing Signed Numbers

If the	signs	are	the	same,	
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## If the signs are different, the answer is *negative*

the a	nswer is positive	the an	swer is <i>negative</i>
	Like Signs	D	ifferent Signs
(+)(+)=+	(+3)(+4)=+12	(+)(-)=-	(+2)(-3)=-6
(- ) (- ) = +	(-5)(-3)=+15	(-)(+)=-	(-7)(+1)=-7
(+)/(+)=+	(+3)/(+4)=+12	(+)/(-)=-	(+2)/(-3)=-6
(+)/(+)=+	(+3)/(+4)=+12	(-)/(+)=-	(-7)/(+1)=-7

## **Operations with Signed Numbers**

94 + 8	10. $-2 + (-7)$	11. 5 - (-13)	1216 - (-9)
13. 5 – 9	14. (-5)(12)	15. —9 <sup>2</sup>	16. $(-9)^2$

# **Evaluating Expressions**

#### Example

Evaluate the following expression when x = 5

Rewrite the expression substituting 5 for the x and simplify.

a.	5x =	5(5)= 25
b.	-2x =	-2(5) = -10
C.	x + 25 =	5 + 25 = 30
d.	5x - 15 =	5(5) - 15 = 25 - 15 = 10
e.	3x + 4 =	3(5) + 4 = 19

## **Evaluating Expressions**

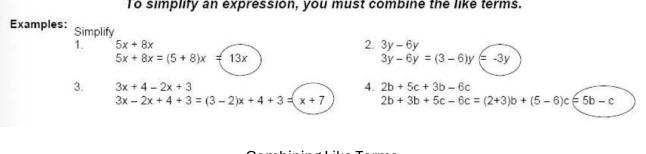
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Evaluate each ex	oression given t	that $x = 5$ ,	v = -4.	z = 6

17. 3 <i>x</i>	18. $y + 4$	19. $2x^2$	20. $5z - 6$
21. $3x^2 + y$	22. $xy + z$	23. $2(x+z) - y$	24. $2x + 3y - z$

	Combining Like Terms
What is a <i>term</i> ?	The parts of an algebraic expression that are separated by an addition o subtraction sign are called <b>terms</b> . The expression $4x + 2y - 3$ has 3 terms.
What are <i>like terms</i> ?	Terms with the same variable factors are called <i>like terms</i> . 2 <i>n</i> and 3 <i>n</i> are <u>like terms</u> , but 4 <i>x</i> and 3 <i>y</i> are <u>not like terms</u> because their variable factors $x$ and $y$ are different.

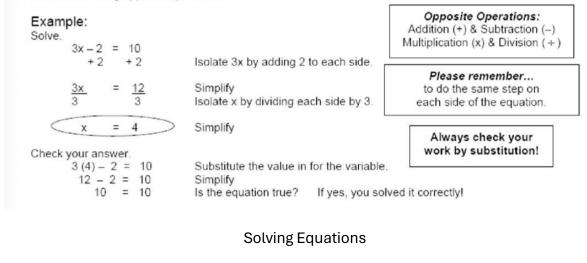
### To simplify an expression, you must combine the like terms.



**Combining Like Terms** 

## Solving Equations

To solve an equation means to *find the value* of the variable. We solve equations by isolating the variable using opposite operations.



29. $x - 6 = 13$	30. $5x - 2 = 8$	31. $\frac{x}{8} = 2$	32. $-4x = 48$
33. $\frac{x}{2} + 3 = 5$	34. $6x + 3(x + 4) = 6 - 1$	2	35. $3b + 5 = 10$

#### Examples:

A) Translate into a mathematical expression: 3 less than 5 times some number

3	less than	5	times	some number
to	subtract from		multiply	use a variable

Translation: 5n – 3

B) Translate into a mathematical statement: 3 less than 5 times some number is 22

3	less than	5	times	some number	is	22	
to	o subtract from		multiply	use a variable		=	

Translation: 5n - 3 = 22

C) Translate into a mathematical statement: the quotient of a number and -4, less 8 is -42

he quotient of a number and -4,			
Divide a variable and a number	subtract	=	

D) Translate into a mathematical statement: four plus three times a number is less than or equal to 18

s a number	is less than or equal to 18
tiply use a va	riable <u>&lt;</u>
	ltiply use a var

Translation:  $4 + 3n \le 18$ 

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#### **Algebraic Translations**

36. a number decreased by 7

37. Twenty-seven is one-third of a number

38. Six decreased by a number results in 3 39. The sum of three times a number and five is fifty.

#### Word Problems

Translate each word problem into an algebraic equation, using x for the unknown, and solve. Write a "let x =" for each unknown; write an equation; solve the equation; substitute the value for x into the let statements(s) to answer the question.

#### For Example:

Kara is going to Maui on vacation. She paid \$325 for her plane ticket and is spending \$125 each night for the hotel. How many nights can she stay in Maui if she has \$1200?

Step 1: What are you asked to fine? Let variables represent what you are asked to find.

How many nights can Kara stay in Maui?

Let x = The number of nights Kara can stay in Maui

Step 2: Write an equation to represent the relationship in the problem.

325 + 125 x = 1200

Solve the equation for the unknown Step 3:

> 325 + 125 x = 1200 - 325 -325 125 x = 875 x = 7 Kara can spend 7 nights in Maui

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

42. Bicycle city makes custom bicycles. They charge \$160 plus \$80 for each day that it takes to build the bicycle. If you have \$480 to spend on your new bicycle, how many days can you take it to Bicycle City to build the bike?

43. Darel went to the mall and spent \$41. He bought several t-shirts that each cost \$12 and he bought 1 pair of socks for \$5. How many t-shirts did Darel buy?

44. Janet weighs 20 pounds more than Anna. If the sum of their weight is 250 pounds, how much does each girl weigh.

45. The school lunch prices are changing next year. The cost of a hot lunch will increase by \$0.45 from the current price. If next year's price is \$2.60, what did a hot lunch cost this year?