AcadeMir Charter Schools

2024 SUMMER INCOMING ALGEBRA 1 MATH PACKET

Please turn into your Math teacher by Friday, August 23rd.

ACADEMIR CHARTER SCHOOLS

Dear incoming Algebra 1 student,

We hope you had a wonderful year in school!

This summer math packet has been created to help you review and prepare for Algebra 1. It covers many of the math topics that you learned in class this year, which we will be building on next year.

- Please <u>show all of your work</u> for every problem in the packet. You can show your work on a separate sheet of paper if space is needed.
- The paper should be neatly organized - with every problem numbered.
- Highlight, draw a box, or draw a circle around your final answers.
- You **<u>MAY</u>** use a calculator.

*Note: *If you submit your summer packet without the work, you* ***WILL NOT*** *receive full credit.*

<u>The completed packet is due on the first week of school by</u>:

<u>Friday, August 23rd</u>.

It will count as your first math grade of the new school year.

We hope you have a nice summer and look forward to seeing you in August!

Name _____

Algebra 1 Summer Review Packet

This packet must be completed the summer before entering Algebra 1. These skills are necessary for a successful year in this course. Please review the notes for each section and complete all subsequent practice problems. **Be sure to show all of your work for full credit. This packet must be completed in its entirety and be ready to be submitted on the Friday, August 23rd.**

I. Writing Algebraic Expressions

In **algebraic expressions,** letters such as *x* and *y* are called variables. A variable is used to represent an unspecified number or value.

Practice: Write an algebraic expression for each verbal expression.

1. Four times a number decreased by twelve _____
2. Three more than the product of five and a number _____
3. The quotient of two more than a number and eight _____
4. Seven less than twice a number _____

II. **Order of Operations**

To evaluate numerical expressions containing more than one operation, use the rules for order of operations. The rules are often summarized using the expression **PEMDAS**

Practice: Evaluate each expression.

1. $250 \div [5(3 \bullet 7 + 4)]$

2. $\dfrac{5^2 \cdot 4 - 5 \cdot 4^2}{5(4)}$

3. $\dfrac{1}{2} \cdot 26 - 3^2$

4. $8^2 \div (2 \bullet 8) + 2$

5. $5 + \left[30 - (6-1)^2\right]$

6. $\dfrac{2 \cdot 4^2 - 8 \div 2}{(5+2) \cdot 2}$

III. Evaluating Algebraic Expressions

To evaluate algebraic expressions, first replace the variables with their values. Then, use order of operations to calculate the value of the resulting numerical expression.

Example: Evaluate $x^2 - 5(x - y)$ if $x = 6$ and $y = 2$

$$\begin{aligned} x^2 - 5(x - y) &= (6)^2 - 5(6 - 2) \\ &= (6)^2 - 5(4) \\ &= 36 - 5(4) \\ &= 36 - 20 \\ &= 16 \end{aligned}$$

Practice: Evaluate each expression.

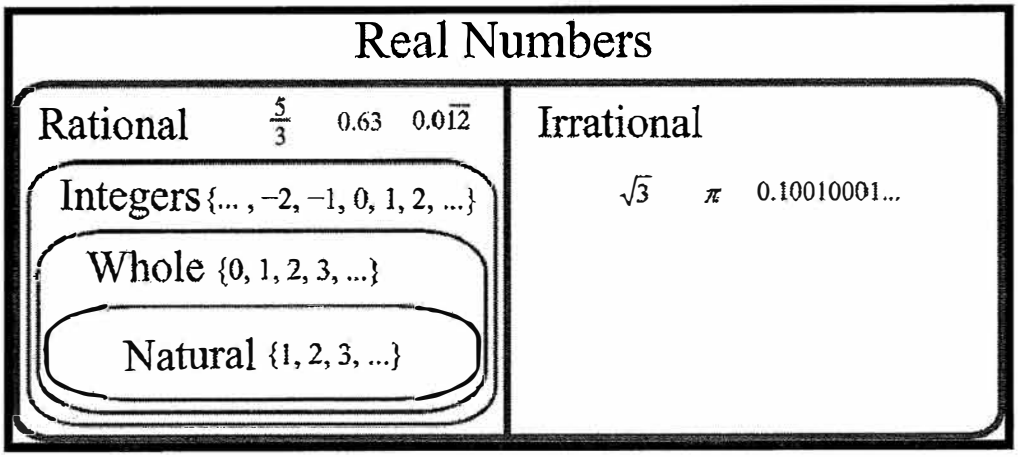
1. $5x^2 - y$ when $x = 4$ and $y = 24$

2. $\dfrac{3xy - 4}{7x}$ when $x = 2$ and $y = 3$

3. $(z \div x)^2 + \dfrac{4}{5}x$ when $x = 2$ and $z = 4$

4. $\dfrac{y^2 - 2z^2}{x + y - z}$ when $x = 12$, $y = 9$, and $z = 4$

IV. The Real Number System



Practice: Name all the sets to which each number belongs.

1. -4.2 _____

2. $3\sqrt{5}$ _____

3. $\frac{5}{3}$ _____

4. 9 _____

5. $\sqrt{16}$ _____

6. $-\frac{8}{2}$ _____

V. Properties of Real Numbers

Following are properties of Real Numbers that are useful in evaluating and solving algebraic expressions.

Additive Identity	For any number a, $a + 0 = a$.
Multiplicative Identity	For any number a, $a \cdot 1 = a$.
Multiplicative Property of 0	For any number a, $a \cdot 0 = 0$.
Multiplicative Inverse Property	For every number $\frac{a}{b}$, a, $b \neq 0$, there is exactly one number $\frac{b}{a}$ such that $\frac{a}{b} \cdot \frac{b}{a} = 1$.
Reflexive Property	For any number a, $a = a$.
Symmetric Property	For any numbers a and b, if $a = b$, then $b = a$.
Transitive Property	For any numbers a, b, and c, if $a = b$ and $b = c$, then $a = c$.
Substitution Property	If $a = b$, then a may be replaced by b in any expression.

Commutative Properties	For any numbers a and b, $a + b = b + a$ and $a \cdot b = b \cdot a$.
Associative Properties	For any numbers a, b, and c, $(a + b) + c = a + (b + c)$ and $(ab)c = a(bc)$.

Practice: Name the property illustrated in each equation.

1. $3 \cdot x = x \cdot 3$ _____
2. $3a + 0 = 3a$ _____
3. $2r + (3r + 4r) = (2r + 3r) + 4r$ _____
4. $5y \cdot \frac{1}{5y} = 1$ _____
5. $9a + (-9a) = 0$ _____
6. $(10b + 12b) + 7b = (12b + 10b) + 7b$ _____
7. $5x + 2 = 5x + 2$ _____
8. If $9 + 4 = 13$ and $13 = 2 + 11$ then $9 + 4 = 2 + 11$ _____

VI. The Distributive Property

The Distributive Property states for any number *a, b,* and *c*:

1. $a(b+c)=ab+ac$ or $(b+c)a=ba+ca$
2. $a(b-c)=ab-ac$ or $(b-c)a=ba-ca$

Practice: Rewrite each expression using the distributive property.

1. $7(h - 3)$
2. $-3(2x + 5)$
3. $(5x - 9)4$
4. $\frac{1}{2}(14-6y)$
5. $3(7x^2-3x+2)$
6. $\frac{1}{4}(16x-12y+4z)$

VII. Combining Like-Terms

Terms in algebra are numbers, variables or the product of numbers and variables. In algebraic expressions terms are separated by addition (+) or subtraction (-) symbols. Terms can be combined using addition and subtraction if they are **like-terms**.

Like-terms have the same variables to the same power.

Example of like-terms: $5x^2$ and $-6x^2$

Example of terms that are **NOT** like-terms: $9x^2$ and $15x$
*Although both terms have the variable **x**, they are not being raised to the same power*

Practice: Simplify each expression

1. $5x - 9x + 2$

2. $3q^2 + q - q^2$

3. $c^2 + 4d^2 - 7d^2$

4. $5x^2 + 6x - 12x^2 - 9x + 2$

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

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

VIII. Solving Equations with Variables on One-Side

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

Practice: Solve each equation.

1. $98 = b + 34$

2. $-14 + y = -2$

3. $8k = -64$

4. $\frac{2}{5}x = 6$

IX. Solving Equations with Variables on Each-Side:

To solve an equation with the same variable on each side, write an equivalent equation that has the variable on just one side of the equation. Then solve.

Practice: Solve each equation.

1. $5+3r=5r-19$

2. $8x+12=4(3+2x)$

3. $-5x-10=2-(x+4)$

4. $6(-3m+1)=5(-2m-2)$

5. $3(d-8)-5=9(d+2)+1$

X. Solving 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.

$325 + 125x = 1200$

Step 3: Solve the equation for the unknown

$$\begin{aligned} 325 + 125x &= 1200 \\ -325 \quad & \quad -325 \\ 125x &= 875 \\ x &= 7 \end{aligned}$$

Kara can spend 7 nights in Maui

Practice: Write an algebraic equation to model each situation. Then solve the equation and answer the question.

1. A video store charges a one-time membership fee of $11.75 plus $1.50 per video rental. How many videos did Stewart rent if he spends $72.00?

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