

# Killingly High School

## Summer Math Packet: Incoming Freshman Students



Dear Student,

Happy summer vacation! We hope you will enjoy yourself during the long summer ahead. **In order to maintain your current math level, it is extremely important for you to complete this packet over the summer.** Doing so will help you have a smooth transition to your high school math class in the fall. We recommend you work on a little bit each week over the summer to get the greatest benefit.

It is your responsibility to finish the packet before the start of school. **This will count as your first graded assignment.** Please label and attach any additional pages to your packet. Your signature at the bottom of this page signifies that you have completed all the work to the best of your ability. If you have trouble on some of the questions, seek assistance from a parent/guardian, the websites below, or other adults who may be able to help you. Best wishes and we will see you soon!

**Here are some online resources you can use:**

khanacademy.org, ixl.com, learnzillion.com, purplemath.com

Sincerely,

Ms. Finkelman, Mrs. Dalbec, and the KHS Math Department

**Please fill in the following information when the summer math packet is complete.**

Student Name (printed):	Student Signature:	Date:	Approximate Amount of Time Spent Completing the Packet:	# of Questions You Needed Adult Help to Complete: (Put an H next to any questions to identify you received help.)

Parent/Guardian Signature:	Date:

## Evaluating Algebraic Expressions

1. Substitute the given values for the variables in the expression
2. Evaluate the expression using the order of operations
  - Parentheses/Brackets (inside to outside)
  - Exponents
  - Multiplication/Division (left to right)
  - Addition/Subtraction (left to right)

ex:  $9x^2 - 4(y + 3z)$   
for  $x = -3, y = 2, z = 5$

$$9(-3)^2 - 4(2 + 3 \cdot 5)$$

$$9(-3)^2 - 4(2 + 15)$$

$$9(-3)^2 - 4 \cdot 17$$

$$9 \cdot 9 - 4 \cdot 17$$

$$81 - 4 \cdot 17$$

$$81 - 68 = 13$$

## The Distributive Property

1. Multiply the number outside the parentheses by each term in the parentheses.
2. Keep the addition/subtraction sign between each term.

ex:  $5(8x - 3)$

$$5(8x - 3)$$

$$5(8x) - 5(3)$$

$$40x - 15$$

## Simplifying Algebraic Expressions

1. Clear any parentheses using the Distributive Property
2. Add or subtract like terms (use the sign in front of each term to determine whether to add or subtract)

ex:  $2(3x - 4) - 12x + 9$

$$2(3x - 4) - 12x + 9$$

$$6x - 8 - 12x + 9$$

$$-6x + 1$$

Evaluate each expression for  $a = 9$ ,  $b = -3$ ,  $c = -2$ ,  $d = 7$ . Show your work.

1. $a - cd$	2. $2b^3 + c^2$	3. $\frac{a + d - c}{b}$	4. $(a - b)^2 + d(a + c)$
5. $4c - (b - a)$	6. $\frac{a}{b} - 5a$	7. $2bc + d(12 - 5)$	8. $b + 0.5[8 - (2c + a)]$

Simplify each expression using the Distributive Property.

9. $5(2g - 8)$	10. $7(y + 3)$	11. $-3(4w - 3)$	12. $(6r + 3)^2$
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Simplify each expression, showing all work.

13. $8(x + 1) - 12x$	14. $6w - 7 + 12w - 3z$	15. $9n - 8 + 3(2n - 11)$	16. $3(7x + 4y) - 2(2x + y)$
17. $(15 + 8d)(-5) - 24d + d$	18. $9(b - 1) - c + 3b + c$	19. $20f - 4(5f + 4) + 16$	20. $8(h - 4) - h - (h + 7)$

## Solving One-Step Equations

1. Cancel out the number on the same side of the equal sign as the variable using inverse operations (addition/subtraction; multiplication/division)
2. Be sure to do the same thing to both sides of the equation!

ex:  $-18 = 6j$

$$\begin{array}{r} -18 = 6j \\ \underline{6 \quad 6} \\ -3 = j \end{array} \rightarrow \boxed{j = -3}$$

## Solving Two-Step Equations

1. Undo operations one at a time with inverse operations, using the order of operations in reverse (i.e. undo addition/subtraction before multiplication/division)
2. Be sure to always do the same thing to both sides of the equation!

ex:  $\frac{a}{7} - 12 = -9$

$$\begin{array}{r} \frac{a}{7} - 12 = -9 \\ \underline{+ 12 \quad + 12} \\ \frac{a}{7} = 3 \end{array}$$

$$\begin{array}{r} \frac{a}{7} = 3 \\ \underline{7 \times \quad 7} \\ a = 21 \end{array}$$

## Solving Multi-Step Equations

1. Clear any parentheses using the Distributive Property
2. Combine like terms on each side of the equal sign
3. Get the variable terms on the same side of the equation by adding/subtracting a variable term to/from both sides of the equation to cancel it out on one side
4. The equation is now a two-step equation, so finish solving it as described above

ex:  $5(2x - 1) = 3x + 4x - 1$

$$10x - 5 = 3x + 4x - 1$$

$$10x - 5 = 7x - 1$$

$$\begin{array}{r} 10x - 5 = 7x - 1 \\ \underline{- 7x \quad - 7x} \\ 3x - 5 = -1 \end{array}$$

$$\begin{array}{r} 3x - 5 = -1 \\ \underline{+ 5 \quad + 5} \\ 3x = 4 \end{array}$$

$$\begin{array}{r} 3x = 4 \\ \underline{3 \quad 3} \\ x = \frac{4}{3} \end{array}$$

$$\boxed{x = \frac{4}{3}}$$

Solve each equation, showing all work.

21. $f - 64 = -23$	22. $-7 = 2d$	23. $\frac{b}{-12} = -6$	24. $13 = m + 21$
25. $5x - 3 = -28$	26. $\frac{w + 8}{-3} = -9$	27. $-8 + \frac{h}{4} = 13$	28. $22 = 6y + 7$
29. $8x - 4 = 3x + 1$	30. $-2(5d - 8) = 20$	31. $7r + 21 = 49r$	32. $-9g - 3 = -3(3g + 2)$
33. $5(3x - 2) = 5(4x + 1)$	34. $3d - 4 + d = 8d - (-12)$	35. $f - 6 = -2f + 3(f - 2)$	36. $-2(y - 1) = 4y - (y + 2)$

# Slope & Rate of Change

Finding the Slope Given Two Points: Use the coordinates from the points in the slope formula:

$$\text{Slope (m)} = \frac{y_2 - y_1}{x_2 - x_1}$$

ex:  $(4, -2), (-3, 8)$   
 $x_1 \quad y_1 \quad x_2 \quad y_2$

$$m = \frac{8 - (-2)}{-3 - 4} = \frac{10}{-7} = -\frac{10}{7}$$

Finding the Rate of Change From a Table: Determine the amount the dependent variable (y) is changing and the amount the independent variable (x) is changing.

$$\text{Rate of Change} = \frac{\text{change in } y}{\text{change in } x}$$

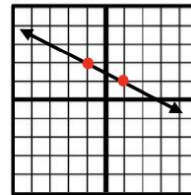
ex:

x	# months	3	5	7	9
y	Cost (\$)	80	130	180	230

$\xrightarrow{+2} \xrightarrow{+2} \xrightarrow{+2}$   
 $\xrightarrow{+50} \xrightarrow{+50} \xrightarrow{+50}$

$$m = \frac{50}{2} = 25 \text{ dollars/month}$$

Finding the Slope From a Graph: Choose 2 points on the graph. Find the vertical change (rise) and horizontal change (run) between the 2 points and write it as a fraction  $\frac{\text{rise}}{\text{run}}$ . (Up is positive, down is negative, right is positive, and left is negative).



rise = +1  
run = -2

$$m = \frac{1}{-2} = -\frac{1}{2}$$

# Graphing Linear Equations

Slope-Intercept Form:  $y = mx + b$   
 $\swarrow \quad \nwarrow$   
 slope      y-intercept

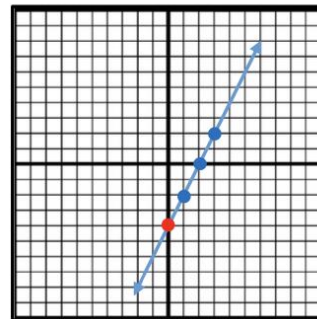
ex:  $y = 2x - 4$

y-intercept: -4

slope:  $2 = \frac{2}{1}$   $\leftarrow$  rise  
 $\leftarrow$  run

How To Graph:

1. Make a point on the y-axis at the y-intercept.
2. Use the slope to determine where to make the next point. The numerator tells you the rise (how far up/down) and the denominator tells you the run (how far right/left) to make the next point.
3. Repeat to make more points and then connect the points with a line.



Find the slope of the line that passes through the points. Show your work.

61. $(-5, 3), (2, 1)$	62. $(8, 4), (11, 6)$	63. $(9, 3), (9, -1)$	64. $(-4, -2), (-6, 4)$

Find the rate of change. Show your work.

65.

Number of Hours	3	6	9	12
Distance (in miles)	135	270	405	540

66.

Number of Weeks	1	3	5	7
Pounds	173	169	165	161

Find the slope of the line.

67.		68.		69.	
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Graph the line.

70. $y = -x - 3$	71. $y = \frac{1}{3}x + 2$	72. $y = -3x - 1$
73. $y = -\frac{3}{2}x - 2$	74. $y = 2x + 1$	75. $y = \frac{1}{4}x$

## Problem Solving



Show all steps to solve each problem.

- 1) If Julia can assemble 3 clipboards in 2 minutes, how many clipboards can she assemble in 15 minutes?



Final Answer:

- 2) An airplane is approaching its final descent into the airport. If the plane descends at a rate of 30 feet per second, what is the change in altitude of the plane after twelve seconds?

Final Answer:

- 3) Elizabeth is planning a trip to Houston and has calculated \$450.95 for lodging, \$98 for food, and \$114.50 for gasoline. How much will her trip cost?

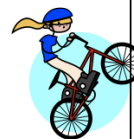


Final Answer:

- 4) Keegan is a babysitter and earns \$8.50 per hour. Last week, she worked 36 hours. What is her total pay?

Final Answer:

- 5) Aleia rides her bike for 2 hours and 45 minutes. If she started riding her bike at 11:30 a.m., at what time will she finish?



Final Answer:

**Important: Be sure to bring this packet to school daily for the first weeks of school!**

1. Which sections of this packet were easiest and most challenging for you?
2. Do you feel confident in your math skills? Why or why not?
3. What is something your math teacher should know about you?
4. List all help you had from another person to complete this packet.  
(Parent/guardian/other adult/websites)

**Congratulations! You finished the summer packet!**