

Integrated Math One      Summer Math Packet  
Summer 2020

**Integrated Math One  
Summer Math Packet**

This is \_\_\_\_\_'s summer math practice.

The purpose of the summer math packet is to maintain your math skills so you can “hit the ground running” at the start of high school.

When: The attached problems are due on the first day of school, September 2020. For best results, make a plan and spread out the work over the summer months.

Suggestion: Do one section every week.

**Choice:** Please complete Section 1 and at least 6 of the other sections.  
So... complete a total of 7 or more sections, including the required Section 1.

**SHOW ALL WORK:** To earn credit for your summer math packet, you must show all work.

Why show work?

- To help you retain the skills in the Summer
- To help your teacher see how best to work with you in the Fall
- So you will earn credit for your summer work

Use a paper copy of this packet to show your work.

Use a digital copy of this packet to click on the links for online resources.

**Resources:** To help you complete the summer math packet, you may use the online resources shown throughout the packet. For some problems, you may need to search for other videos related to the ones you'll find at the links given in the packet.

**Section 1: Using Equations and Expressions THIS SECTION IS REQUIRED**

**Section 2: Problem-solving: Saving Money**

**Section 3: Numbers and Operations**

**Section 4: Fractions/Decimals/Percents**

**Section 5: Graphing Lines**

**Section 6: Ratio and proportion**

**Section 7: Writing Equations and Expressions**

**Section 8: Recording Contract: Deal #1 or Deal #2?**

**Section 9: Data and probability**

**Section 10: Area and perimeter**

**Section 1: Using Equations and Expressions**      **THIS SECTION IS REQUIRED**

**Web resources**

Evaluate expressions

<http://www.khanacademy.org/math/algebra/solving-linear-equations-and-inequalities/variable-and-expressions/v/variables-and-expressions-1>

Solve equations

<http://www.purplemath.com/modules/solvelin3.htm>

Order of operations

<http://www.khanacademy.org/math/arithmetic/multiplication-division/order-of-operations>

Combine like terms

<http://www.purplemath.com/modules/polydefs2.htm>

**Complete the following problems. SHOW ALL WORK ON THIS PAGE**

1. If  $x = 5$ , then  $\frac{x+7}{4} =$

2. If  $x = 3$ , then  $x^2 =$

3. If  $x = -3$ , then  $x^2 =$

4. Solve for  $x$ . Check your solution.

$$9x = 27$$

5. Solve for  $a$ . Check your solution.

$$3a + 4 = 22$$

6. Solve for  $n$ . Check your solution.

$$-5n - 7 = 18$$

7. Solve for  $y$ , if  $x = 10$

$$4y + 2x = 12$$

**Section 1: Using Equations and Expressions (continued)    THIS SECTION IS REQUIRED**

On this page, the problems are NOT equations (notice there are no = signs).  
The problems on this page are expressions.

Don't solve for x. Just simplify the expressions.  
Be sure to use the correct order of operations (remember "PEMDAS").

**SHOW ALL WORK ON THIS PAGE**

8.  $4 + 5 \cdot 4$

9.  $6 \cdot 2t - 3t$

10.  $6(2t - 3t)$

11. *Why does problem 9 have a different answer than problem 10?*

12.  $-3d + 5 + 3d$

13.  $(-6x + 10) + (4x - 2)$

**Section 2: Problem-solving: Saving Money**

**SHOW ALL WORK**

Resources:

<https://www.khanacademy.org/math/algebra/linear-word-problems/modal/v/graphing-linear-functions-1>

Suppose Eli gets a great job and saves \$200 per week.  
Before he got the job his bank account had \$325 in it.

A.  $M$  = amount of money Eli has in the bank.

$W$  = weeks since Eli started his new job

Write an equation for the amount of money in the bank ( $M$ ), after  $W$  weeks.

Use slope-intercept form ( $y = mx + b$ )

Equation:  $M = \underline{\hspace{1cm}} W + \underline{\hspace{1cm}}$

**Slope** =  $\underline{\hspace{1cm}}$  = **rate of change** (how fast the bank balance is changing)

**y-intercept** =  $\underline{\hspace{1cm}}$  = **starting amount** (bank balance when weeks = 0)

B. Eli wants to save \$3000.

After how many weeks will the bank balance be \$3000 or more?

Use any method you like:

- You may use the equation you wrote in part A.
- Or you may make a table of the two variables money ( $M$ ) and weeks ( $W$ ).
- Or do you have another method?

On the next page, show your work  
and explain in words how you know  
your answer is correct>>>>>

Whichever method you choose,  
you must :

Show your work  
AND  
Explain in words how you know  
your answer is correct

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Use this page to show your work for Section 2.

Show your work and explain in words how you know your answer is correct.

“After how many weeks will the amount in the bank be \$3000 or more?”

**Section 3: Numbers and Operations**  
**SHOW ALL WORK**

**Online resources:**

Addition of Integers –

- <http://www.mathgoodies.com/lessons/vol5/addition.html>
- <http://www.youtube.com/watch?v=204uFu0DRWE>

Subtraction of Integers –

- <http://www.mathgoodies.com/lessons/vol5/subtraction.html>

Multiplication and division of integers

- [http://www.mgccc.edu/learning\\_lab/math/multdiv.html](http://www.mgccc.edu/learning_lab/math/multdiv.html)

Absolute value –

- <http://www.purplemath.com/modules/absolute.htm>

Square root -  $\sqrt{\#}$

- <https://www.khanacademy.org/math/arithmetic/exponents-radicals/radical-radicals/v/understanding-square-roots>

1) For each problem, add the two integers:

a)  $-21 + 3$  a) \_\_\_\_\_

b)  $17 + (-20)$  b) \_\_\_\_\_

c)  $-12 + (-5)$  c) \_\_\_\_\_

2) Complete the following subtraction problems:

a)  $22 - (-15)$  a) \_\_\_\_\_

b)  $-15 - 7$  b) \_\_\_\_\_

c)  $12 - 18$  c) \_\_\_\_\_

**Section 3: Numbers and Operations (continued)**

3) Which of the following equal  $-39$ ? \_\_\_\_\_  
(circle *all* correct answers; there may be more than one)

i.  $-13 \cdot 3$

ii.  $-13 \cdot (-3)$

iii.  $13 \cdot (-3)$

iv.  $-1 \cdot 39$

4)  $\frac{24}{-3} =$  \_\_\_\_\_

5) Which expression has the larger value,  $\sqrt{16}$  or  $3^2$ ? How do you know?

**Section 4: Fractions/Decimals/Percents**

**SHOW ALL WORK**

**Web resources:**

Vocabulary - information about underlined words in the problems below can be found at:

- <http://www.mathwords.com/>
- <http://www.math.com/school/glossary/glossindex.html>

Fractions and mixed numbers (add, subtract, multiply, divide) –

- <https://www.khanacademy.org/math/arithmetic/fractions>

Percent problems - [http://www.mathgoodies.com/lessons/percent/sale\\_price.html](http://www.mathgoodies.com/lessons/percent/sale_price.html)

Equivalent fractions, decimals, percents –

- <http://www.mathsisfun.com/decimal-fraction-percentage.html> (scroll down to “conversions”)

**Remember to do the following problems *WITHOUT A CALCULATOR*.**

**You should do these types problems without a calculator in high school.**

1) Subtract. Show your work.  $\frac{3}{4} - \frac{1}{4} =$

2) Add. Show your work.  $\frac{3}{4} + \frac{1}{2} =$

3) Multiply. Show your work.  $\frac{5}{2} \times \frac{1}{6} =$

4) Divide. Show your work.  $\frac{5}{2} \div \frac{1}{6} =$



**Section 4: Fractions/Decimals/Percents (continued)**

5) Write the reciprocal of  $-\frac{5}{9}$  \_\_\_\_\_

6) Add. Show your work.  $5.01 + 0.43$  \_\_\_\_\_

7) A jacket originally sold for \$45. This week it is on sale for 20% off.  
How much was the price reduced? Show your work.

Reduced price \_\_\_\_\_

8) A student answered 44 questions correctly on a test with 55 questions. What percent of the test was answered correctly? Show your work.

Percent correct \_\_\_\_\_

9) Reduce  $\frac{12}{16}$  to a fraction in simplest form.

10) Write  $\frac{3}{5}$  as a decimal number \_\_\_\_\_

11) Write  $\frac{3}{5}$  as a percent \_\_\_\_\_

## Section 5: Graphing Lines

Lets use the topic of evaluating expressions to graph lines.

For example if I have the equation of a line  $y = 3x - 2$

I could make an X-Y table(like the one shown below) and substitute numbers in for x to get the y

To make a table, substitute each x-value into the equation, and find y

so with an x value of -3  $\Rightarrow$   $y = 3(-3) - 2$   
 $y = -9 - 2 = -11$

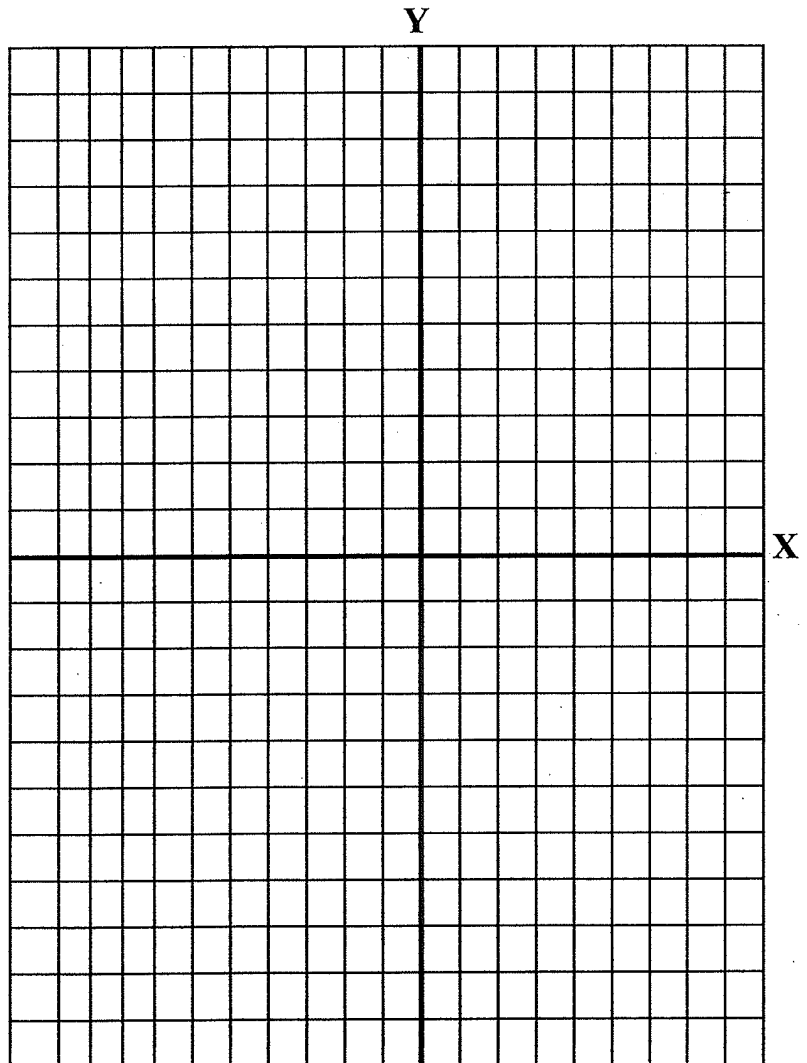
To make the graph, plot the points from the table. Then connect the points using a straight edge.

**If your line is not straight, something is wrong. Check your work.**

X	Y
-3	-11
-2	-8
-1	-5
0	-2
1	1
2	4
3	7
4	10

**The y-intercept** is the point where the line crosses the y-axis and it has an x value of 0.

For our graph the y-intercept is  
( 0, -2 )



**Try these problems on your own**

Use the equation  $y = 2x + 1$

**Make your table**

To make a table, you make up the  $x$  values.

Be sure to use both negative and positive numbers for  $x$ .

Since you know the  $y$ -intercept has an  $x$  value of 0,

Use numbers on both sides of zero.

Then substitute each  
 $x$ -value into the equation, and find  $y$ .

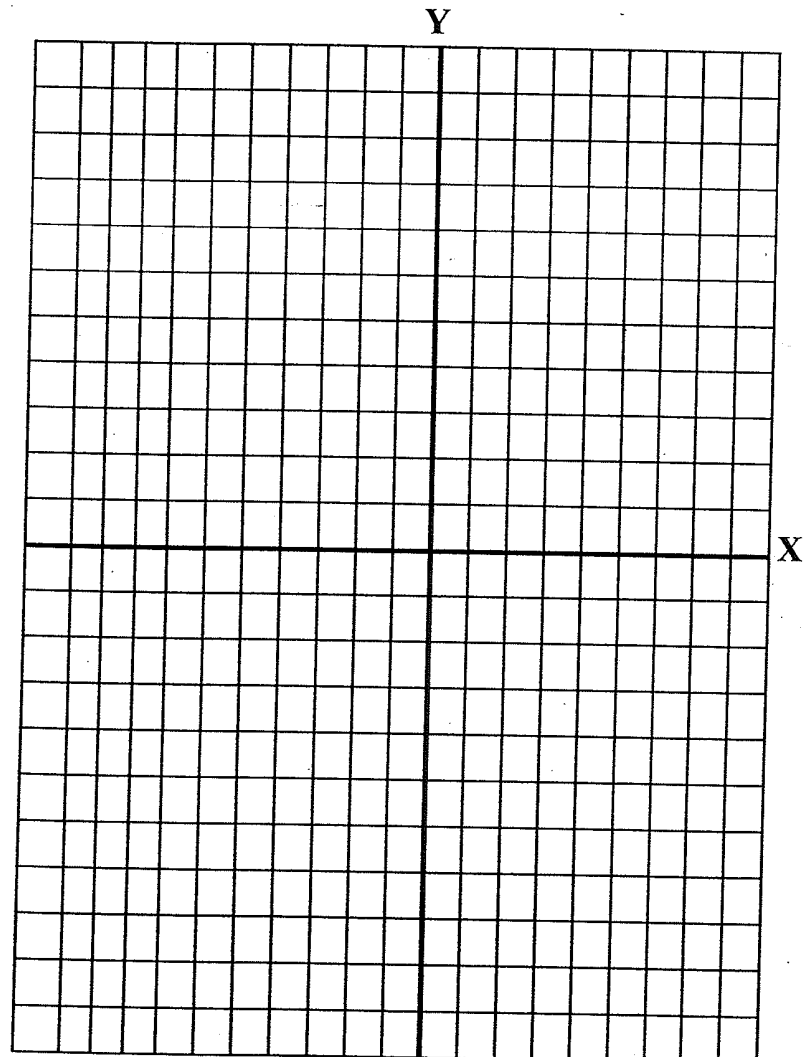
Now make the graph by plot the points from the table.

Connect the points using a straightedge.

**If your line is not straight, something is wrong.**

**Check your work.**

X	Y



**Section 6: Ratio and proportion**  
**SHOW ALL WORK**

**Web resources**

[http://www.khanacademy.org/math/arithmetic/rates-and-ratios/ratios and proportions](http://www.khanacademy.org/math/arithmetic/rates-and-ratios/ratios-and-proportions)

**Complete the following problems. SHOW ALL WORK**

1. Reduce the fraction to lowest terms:  $\frac{12}{15}$
  
2. A. Write the ratio of baseballs to bats in the team's storage locker if there are 10 baseballs and 7 bats.  
  
B. Use the information from Part A to estimate the number of bats in the team's locker if there were 30 baseballs.
  
3. The equation below is called a proportion because it shows that two ratios are equal.

Solve for  $d$ :  $\frac{16}{d} = \frac{2}{3}$

## **Section 6: Ratio and proportion (continued)**

**SHOW ALL WORK**

4. For this problem, a 3 pound package of hamburger costs \$11.40.  
What is the cost of one pound of hamburger?
5. The scale on a map indicates 1 inch = 150 miles. If the map shows Philadelphia and Miami 8 inches apart, what is the actual distance from Philadelphia to Miami?
6. A recipe calls for 3 cups of sugar for every 4 pounds of fruit. How many cups of sugar are required for 10 pounds of fruit?

### **Section 7: Writing Equations and Expressions**

**Writing equations and expressions is when you take word problems and turn them into an equation with numbers in order to solve the problem.**

**Example 1: A number is 5 more than another number.**

**In order to solve we need to first set up our variables**

So after reading this I know that there are two numbers. Whenever we have a number that we do not know the value of we use a variable instead. That's why we have to set up our variables.

Let  $x$  = the first number

Let  $y$  = second number

Next establish which number will be five more than the other. Let's say that it is  $y$ .

Since  $y$  is 5 more than the other number, in order for us to find  $y$  we would have to add 5 to  $x$ . which is represented as  $y = x + 5$  and we are done

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**Try writing these equations on your own**

**Use these key words to help write your equations**

**Is:** equals (=)

**Sum:** addition (+)

**Difference:** subtraction (-)

**Product:** Multiplication (\*)

**Quotient:** Division ( $\div$ )

**Problems 1-6: Just write the equation.**

1. 4 divided by a number

2. The sum of p and 11

3. the product of a number and 5 is 7

4. 11 more than y is equal to 33

5. 8 more than a number is equal to 16

6. the product of a number and 5 is equal to 31

**Section 8:**

**Recording Contract: Deal #1 or Deal #2?**



Nice work.

Your group was just offered two recording contracts.

Call them Deal #1 and Deal #2:

**Deal #1:** You earn \$1.00 for each download,  
plus you receive a \$60,000 signing bonus.

**Deal #2:** You earn \$3.00 for each download,  
but you receive no bonus.

1. Which deal would you accept? Why?
2. If you took Deal #2, how many downloads would you need to sell to earn *the same* income as you would earn with Deal #1?

\_\_\_\_\_downloads

*How do you know?*

TWO WAYS TO SHOW HOW YOU KNOW THE ANSWER

You could compare the two deals in a table like the one on the next page>>>

OR....

You could write an equation for Deal #1 and another equation for Deal #2.

Then you could solve the system of equations.

*Show all work in the space below or on the next page>>>>*



**Section 8 (continued):**

**Recording Contract: Deal #1 or Deal #2?**

If you took Deal #2, how many downloads would you need to sell to earn the **same** income as you would earn with Deal #1?

*How do you know?*



You may complete the table below to help answer the question:

$x = \text{number of downloads}$	$y_1 = \text{income with Deal \#1}$	$y_2 = \text{income with Deal \#2}$
0	\$60,000	0
10,000	\$70,000	\$30,000
100,000	\$160,000	\$300,000

**Section 9: Data and probability**  
**SHOW ALL WORK**

**Web resources**

Median and mean (#1 below)

<http://www.purplemath.com/modules/meanmode.htm>

Scatterplots (#2 below)

<http://www.mathgoodies.com/lessons/graphs/line.html>

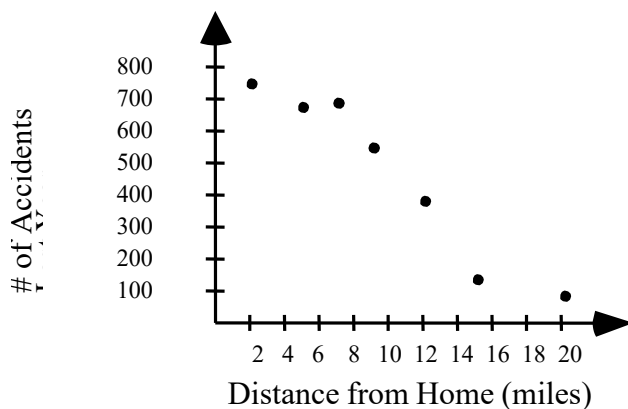
<http://www.purplemath.com/modules/scattreg.htm>

Probability (#3-6 on the next page)

[https://www.khanacademy.org/math/trigonometry/prob\\_comb/basic\\_prob\\_precalc/v/basic-probability](https://www.khanacademy.org/math/trigonometry/prob_comb/basic_prob_precalc/v/basic-probability)

**Complete the following problems. SHOW ALL WORK ON THIS PAGE**

1. The students in a summer school math class took a 10 point quiz on Friday and received scores of 7, 8, 8, 9, 9, 9, 6, 5, 4, and 9.
  - A. What is the median of the scores?
  - B. What is the average score?
2. The graph below describes the relationship between the distance from home and the number of accidents.



- A. As the distance from home increases, the number of accidents \_\_\_\_\_
- B. Approximately \_\_\_\_\_ accidents occurred more than 20 miles from home.

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3. If you flip a coin once, what is the probability of the coin landing on “heads”?
  
  
  
  
  
  
  
  
  
  
4. If you flip a coin 3 times, what is the probability of the coin landing on “heads” all 3 times?
  
  
  
  
  
  
  
  
  
  
5. If you roll a 6-sided die with the numbers 1, 2, 3, 4, 5, and 6 on it, what is the probability of the die landing on an odd number?
  
  
  
  
  
  
  
  
  
  
6. Name an event which has a probability of “one.”

**Section 10: Area and perimeter**  
**SHOW ALL WORK**

**Web resources**

Area of rectangles

[http://www.mathgoodies.com/lessons/vol1/area\\_rectangle.html](http://www.mathgoodies.com/lessons/vol1/area_rectangle.html)

Area of triangles

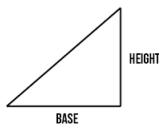
[http://www.mathgoodies.com/lessons/vol1/area\\_triangle.html](http://www.mathgoodies.com/lessons/vol1/area_triangle.html)

Perimeter

<http://www.mathgoodies.com/lessons/vol1/perimeter.html>

**Complete the following problems. SHOW ALL WORK ON THIS PAGE**

1. The first floor of a one-story house is in the shape of a rectangle. The house is 25 feet wide and 60 feet from front to back. What is the area of the first floor of the house?
2. A triangle has a base of 10 inches and a height of 25 inches. What is the area of the triangle?



3. A patio is a rectangle 12 feet wide and 16 feet long. The patio is completely surrounded by a fence. The length of the fence is called the perimeter of the rectangle.

How long is the fence ? (Or, what is the perimeter of the rectangle?)

**Section 10: Area and perimeter (continued)**

4. A square has an area of 64 square feet.

Draw the square here >>>>>

A. What is the length of each side of the square?

B. What is the perimeter of the square?

5. Imagine you are building a rectangular playground in a township park and it needs to be 1000 square feet in area. You have the job of deciding the length and width of the playground and ordering the fence to enclose the playground.

A. Choose the length and the width. There is more than one correct answer, but the playground must be a rectangle and the area must be 1000 square feet.

Length = \_\_\_\_\_

Width = \_\_\_\_\_

Show your work to verify the area is 1000 square feet.

B. What is the perimeter of the rectangle you chose?  
(In other words, how much fence do you need to order?)