

## Welcome to Algebra 1

This summer packet must be completed by the first day of school. It reviews fraction and decimal skills, integers, order of operations, percents, some geometry, and algebra skills; all skills essential to be successful in 8<sup>th</sup> grade Algebra 1. To receive credit, all of your work must be shown. If you are working with fractions, your answer should be in fraction form, decimal expressions should have answers in decimal form, steps must be included in the order of operations problems, formulas in the geometry problems, and all work on the word problems. Do not expect to complete this packet in one sitting. Work on it for 15-20 minutes at a time, several days each week.

The first grade you will receive next year will be the grade of a test you will be given the first week of school that will assess your knowledge of these skills.

If you have any questions, please email one of us over the summer.

Have a wonderful break!!!

Mrs. Bunting and Mrs. Race

## Sample Problems - Expected Level of Work to be Shown

a. Evaluate  $|3x-4|$  when  $x=-2$

$$\begin{aligned} & |3(-2) - 4| \\ & |-6 - 4| \\ & |-10| = 10 \end{aligned}$$

b. Solve for the variable  $5(3x-4)=28-x$ .

$$5(3x-4) = 28-x$$

$$15x - 20 = 28 - x$$

$$\begin{array}{r} +x \\ \hline 16x - 20 = 28 \end{array}$$

$$\begin{array}{r} +20 \quad +20 \\ \hline 16x = 48 \end{array}$$

$$16x = 48$$

$$16x = 48$$

$$\frac{16x}{16} = \frac{48}{16}$$

$$\boxed{x = 3}$$

c. At the deli, Tom bought a loaf of bread for \$3.19. He also bought 3.5 pounds of turkey at a cost of  $x$  dollars per pound. The total cost of those items was \$26.99. What is the cost per pound of the turkey?

cost of bread + cost of turkey = total cost

$$3.19 + 3.5x = 26.99$$

$$\begin{array}{r} -3.19 \quad \quad \quad -3.19 \\ \hline 3.5x = 23.8 \end{array}$$

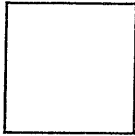




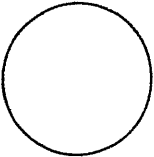
$$3.5x = 23.8$$

$$\frac{3.5x}{3.5} = \frac{23.8}{3.5}$$

$$\boxed{x = \$6.80 \text{ per pound of turkey.}}$$

$x =$  cost  
of 1 lb  
of turkey

## Common Formulas

Figure	Perimeter Distance around the outside	Area Surface that is covered
Square:  <i>s</i> = side	$P = 4s$	$A = s^2$
Rectangle: <i>l</i> = length <i>w</i> = width 	$P = 2(l + w)$ <i>or</i> $P = 2l + 2w$	$A = lw$
Triangle: <i>a</i> = altitude <i>b</i> = base 	$P = \text{sum of the sides}$	$A = \frac{1}{2}ab$
Parallelogram: <i>a</i> = altitude <i>b</i> = base 	$P = 2(l + w)$ <i>or</i> $P = 2l + 2w$	$A = ab$
Trapezoid: <i>a</i> = altitude <i>b</i> <sub>1</sub> = base 1 <i>b</i> <sub>2</sub> = base 2 	$P = \text{sum of the sides}$	$A = \frac{1}{2}h(b_1 + b_2)$
Circle: <i>d</i> = diameter <i>r</i> = radius 	Circumference  $C = \pi d$	$A = \pi r^2$

Summer Packet

Name: \_\_\_\_\_

Algebra I

Date: \_\_\_\_\_

1) Find the next three numbers in the sequence:

a) 4, 9, 14, 19, 24...

b) 16, 8, 4, 2, 1,...

2) Write an algebraic expression for that represents each verbal expression:

a) The cost of movie ticket \$8.50 increased by the cost of a soda  $s$

b) The number of hours in  $d$  days

c) The decibel level of a rock concert 120 decreased by ear plugs with a efficiency rating of  $p$  decibels.

Number of hours: $h$	Process	Cost: $c$
0		
1		
2		
3		
4		
5		

- 3) Julia rents surfboards at the beach for \$5 plus \$1.50 per hour. Write an equation for the cost, using the variable  $h$  and  $c$ .
- 4) A can of soft drink contains 355 ml of liquid. If 5 people split 2 cans evenly, how many milliliters will each get?
- 5) How many \$5 raffle tickets must you sell to raise \$32?
- 6) Determine whether each number is prime, composite or neither:
- a) 47                      b) 1                      c) 0                      d) 372                      e) 57
- 7) Given the following numbers state whether they are divisible by 2, 3, 5, 6, 9, or 10:
- a) 1728                      b) 3570                      c) 730                      d) 108                      e) 6234
- 8) Make a list of the factors of 72. Circle all the prime factors.
- 9) Rewrite the expressions below using exponents:
- a)  $5 \cdot 5 \cdot 5 \cdot 5$                       b)  $x \cdot x \cdot x \cdot 3 \cdot 3 \cdot 3$
- 10) Evaluate each power:
- a)  $2^5$                       b)  $3^4$                       c)  $.5^3$

11) Write the prime factorization of each number:

a) 54

b) 399

12) Simplify using the correct order of operations:

a)  $7 + 6 \div 2 + 9^2$

b)  $2(5+4) \div 9$

13) Given a is 5, b is 3, and c is 4 evaluate each expression:

1)  $(a + b) - c$

2)  $a^2 - b - c$

14) Name the property illustrated:

a)  $(27 + 98) + 73 = 27 + (98 + 73)$  \_\_\_\_\_

b)  $(6 - 3)5 = 6 \cdot 5 - 3 \cdot 5$  \_\_\_\_\_

c)  $(-17) + 18 = 18 + (-17)$  \_\_\_\_\_

15) Circle all the integers in the following list:

1, -5,  $\frac{1}{2}$ , 0, 7,  $6.\bar{3}$



20) Find each difference:

a)  $13 - (-13)$

b)  $12 - 15 - (-15)$

c)  $-18 - |-18| - (-18)$

21) Use  $<$  or  $>$  to indicate the relationship between the following numbers:

a)  $-3$  \_\_\_\_\_  $0$

b)  $-18$  \_\_\_\_\_  $-15$

c)  $-6.5$  \_\_\_\_\_  $-6.006$

22) Simplify:  $2(3+4) - 2 + 3^2(4) - 6 + 1$

23) Order the numbers from least to greatest  $-0.6$ ,  $-\frac{2}{3}$ ,  $-0.74$ ,  $-\frac{3}{5}$ ,  $-.05$ ,  $-\frac{1}{3}$

24) Write each number as a mixed number or a fraction in lowest terms and as a decimal:

a) five hundred five and twenty-five thousandths \_\_\_\_\_

b) six hundred sixty-seven thousandths \_\_\_\_\_

c) three hundred two and seventy-five ten-thousandths \_\_\_\_\_



25) Rewrite each of the following expressions with common denominators then simplify:

a)  $6\frac{2}{3} - 3\frac{1}{4}$

b)  $8\frac{7}{10} - \frac{7}{8}$

26) Find the reciprocals of the following numbers:

a)  $-\frac{1}{3}$

b)  $2\frac{3}{5}$

c)  $-2.3$

27) Find the area of the rectangle with sides  $3\frac{2}{5}$  and  $\frac{5}{7}$  inches.

28) Rewrite each expression as improper fractions then simplify.

a)  $9\frac{2}{5} \div 3\frac{5}{6}$

b)  $-4\frac{1}{2} \div 2\frac{2}{3}$

c)  $\left(-3\frac{1}{2}\right)\left(-6\frac{2}{3}\right)$

29) Solve the following proportions:

a)  $\frac{x}{54} = \frac{7}{9}$

b)  $\frac{20}{30} = \frac{x}{3}$

c)  $\frac{75}{x} = \frac{15}{16}$

30) The ratio of **apple trees to peach trees** in Mr. Green's orchard are **7 : 4**. How many peach trees are planted if Mr. Green has 56 apple trees in his orchard?

32) Rewrite each of the following as a percent:

a) 3.59

b)  $13\frac{3}{8}$

c)  $\frac{9}{12}$

d) 0.002

33) An investment is expected to yield a profit of 1.8% per year. If the investment is \$4050, what is the approximate yield for the year?

34) A bag contains 12 marbles: 4 red ( R), 6 green ( G) and 2 white (W) if the marbles are randomly drawn from each bag find the following probabilities (*P(G) means probability of drawing a green*):

a) P ( G)

b) P ( R)

c) P (not W)

d) P ( R or W)

35)

Trial	1	2	3	4	5
Coin 1	H	T	T	T	H
Coin 2	T	T	H	H	T

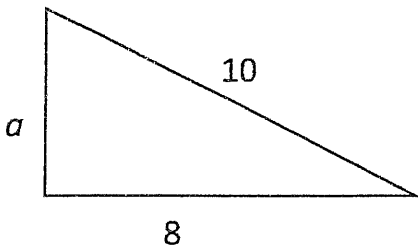
Use the data in the table above to find the experimental probability of:

a) At least one coin is heads

b) Both coins are tails

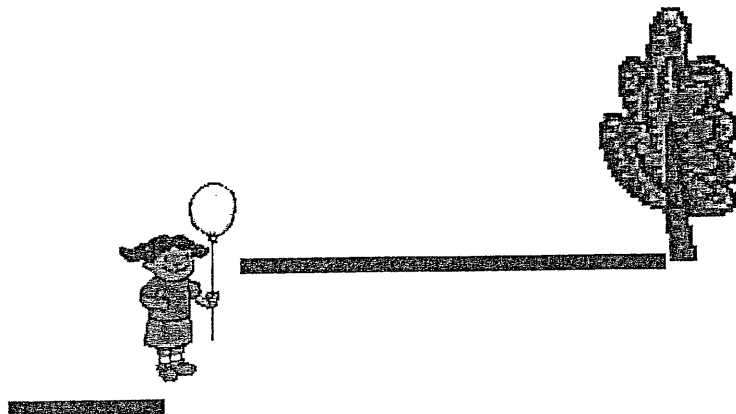
c) Both coins are heads

36) Find the length of the missing side of the given right triangle:



37) Is the triangle that has sides that measure: 1, 1.5, and 2 yards a right triangle? Show your work.

38) Katrina's height is 1.6 meters. Her shadow measures 1.1m. How big is the shadow of a tree that measures 13 m. Show all work. (Hint: use ratios)



39) Find the areas of the given polygons. Show the formula, substitutions, and solutions in the correct units.

a) Square with sides 2"

b) Rectangle with sides 2' and 3.5'

c) Triangle with altitude 4 m, and base of 6m.

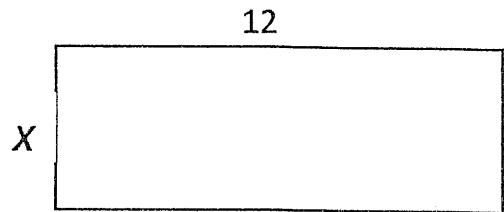
d) Trapezoid with  $b_1 = 3$  ft,  $b_2 = 8$  ft,  $h = 5.5$  ft.

e) Parallelogram with base of 5.7 cm, and a height of 2.1 cm.

40) Write an equation to show that the perimeter of this rectangle is 52. Then solve for  $x$ . Show your work.

Equation: \_\_\_\_\_

$x =$  \_\_\_\_\_



41) Solve the following for  $y$ :  $x + y = z$

Simplify each expression. Show all work:

42)  $3a^2 - 3a + 2a^2 + 5a$

43)  $6y + 2x - 7y - 2x$

44)  $-33x \div 3$

45)  $\frac{-30y+36}{-3}$

Use the Distributive Property to find each product.

46)  $5(h-4)$

47)  $4t(t^2+7)$

48)  $b(12b^2+11b)$

Find the Greatest Common Factor for the terms of each expression.

49)  $6x^2+8$

50)  $5c^3-25c$

51)  $z^4+5z^2$

For numbers 52 – 54 set up an equation letting  $x$  represent the unknown, then find the value of  $x$ .

52) What is 55% of 60?

53) What percent of 15 is 3?

54) 28 is 70% of what number?

Solve each equation. Show all steps.

55)  $(x-5)=8$

56)  $x-\frac{2}{3}=\frac{5}{8}$

57)  $-3x+4=-8$

58)  $3w+1+6w=-5$

Solve each word problem 59-63. Identify the variables, set up an equation and solve. Show all steps.

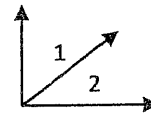
59) Find three consecutive integers whose sum is 141.

60) Lynn has scores of 95, 91, and 88 on three tests. Write and solve an equation to find a fourth score that will produce an average of 90 for the four tests.

61) The perimeter of a rectangle is 56 feet. The length is 3 feet more than the width. What are the dimensions of the rectangle?

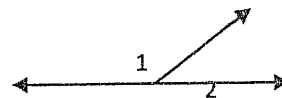
62) Angles 1 and 2 are complementary. Find the measures of both angles

$$m\angle 1 = \frac{x}{2} + 18 \quad m\angle 2 = 4x$$



63) Angles 1 and 2 are supplementary. Find the measures of both angles.

$$m\angle 1 = 5x + 9 \quad m\angle 2 = 7x + 15$$

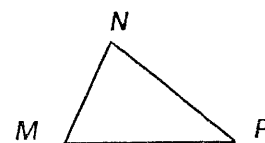


64) Find the measure of each angle in  $\triangle MNP$  (not drawn to scale). Show an equation and the solution.

$$m\angle M = x$$

$$m\angle N = 4 + x$$

$$m\angle P = 6x$$





Find the solutions. Show all work.

65)  $-3p < 12$

66)  $4x - 2 \geq 2x + 3$

For number 67 and 68 name the letter that corresponds to the given points, and identify in which quadrant it is located, I, II, III, or IV:

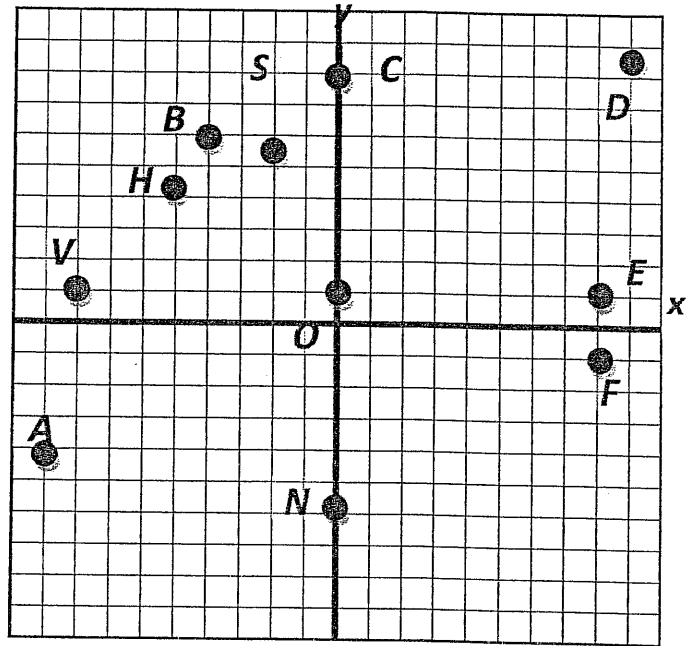
67)  $(-9, -6)$  \_\_\_\_\_

68)  $(0, 8)$  \_\_\_\_\_

Name the coordinates of the following points:

69)  $F$  \_\_\_\_\_

70)  $H$  \_\_\_\_\_



Additional references you may need for this worksheet:

- Pythagorean Theorem:  $a^2 + b^2 = c^2$
- The sum of the angles in a triangle is  $180^\circ$ .
- The sum of complementary angles is  $90^\circ$ .
- The sum of supplementary angles is  $180^\circ$ .