

Name \_\_\_\_\_

## 10<sup>th</sup> Grade Math and Science Summer Packet

### Solving Linear Equations: Variable on Both Sides

Solve each equation.

1)  $6r + 7 = 13 + 7r$

2)  $13 - 4x = 1 - x$

3)  $-7x - 3x + 2 = -8x - 8$

4)  $-8 - x = x - 4x$

5)  $-14 + 6b + 7 - 2b = 1 + 5b$

6)  $n + 2 = -14 - n$

7)  $n - 3n = 14 - 4n$

8)  $7a - 3 = 3 + 6a$

9)  $5 + 2x = 2x + 6$

10)  $-10 + x + 4 - 5 = 7x - 5$

11)  $-8n + 4(1 + 5n) = -6n - 14$

12)  $-6n - 20 = -2n + 4(1 - 3n)$

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

**Directions:** Round each answer to the nearest tenth of a unit.

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- 1) A student measures the mass of an  $8 \text{ cm}^3$  block of brown sugar to be 12.9 g. What is the density of the brown sugar?
  
- 2) A chef fills a 50 mL container with 43.5 g of cooking oil. What is the density of the oil?
  
- 3) Calculate the mass of a liquid with a density of 2.5 g/mL and a volume of 15 mL.
  
- 4) Calculate the volume of a liquid with a density of 5.45 g/mL and a mass of 65 g.
  
- 5) A machine shop worker records the mass of an aluminum cube as 176 g. If one side of the cube measures 4 cm, what is the density of the aluminum?
  
- 6) A teacher performing a demonstration finds that a piece of cork displaces 23.5 mL of water. The piece of cork has a mass of 5.7 g. What is the density of the cork?

11) A student performs an experiment with three unknown fluids and obtains the following measurements:

Fluid A:  $m = 2060 \text{ g}$ ,  $V = 2000 \text{ mL}$

Fluid B:  $m = 672 \text{ g}$ ,  $V = 850 \text{ mL}$

Fluid C:  $m = 990 \text{ g}$ ,  $V = 1100 \text{ mL}$

Draw how the fluids would be layered if they were combined in a beaker.



12) Use your density skills to find the identity of the following mystery objects.

Table of Densities			
Solids	Density $\text{g/cm}^3$	Solids	Density $\text{g/cm}^3$
Marble	2.56	Copper	8.92
Quartz	2.64	Gold	19.32
Diamond	3.52	Platinum	21.4



While digging in the backyard, you find an old coin. Its mass is  $26.76 \text{ g}$  and its volume is  $3 \text{ cm}^3$ .



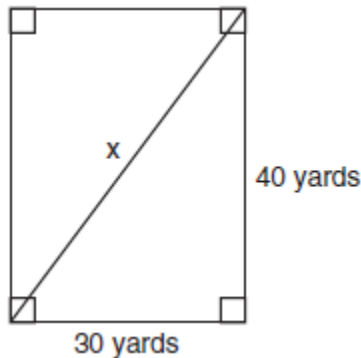
You think you have found a diamond. Its mass is  $5.28 \text{ g}$  and its volume is  $2 \text{ cm}^3$ .

**Watch the video below to help with a review of the Pythagorean Theorem**

$$a^2 + b^2 = c^2$$

<https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-geometry/cc-8th-pythagorean-theorem/v/the-pythagorean-theorem>

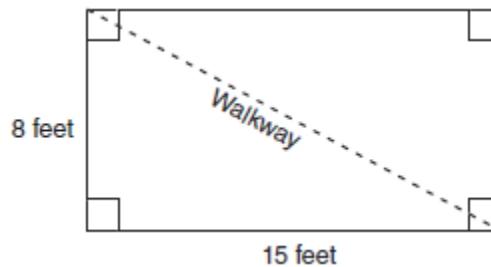
- 1 Tanya runs diagonally across a rectangular field that has a length of 40 yards and a width of 30 yards, as shown in the diagram below.



What is the length of the diagonal, in yards, that Tanya runs?

- 1) 50
- 2) 60
- 3) 70
- 4) 80

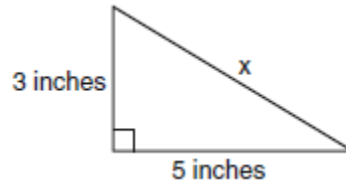
- 2 Nancy's rectangular garden is represented in the diagram below.



If a diagonal walkway crosses her garden, what is its length, in feet?

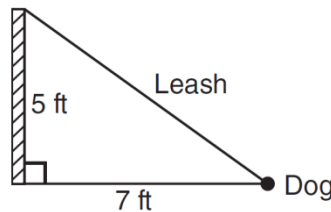
- 1) 17
- 2) 22
- 3)  $\sqrt{161}$
- 4)  $\sqrt{529}$

3 What is the value of  $x$ , in inches, in the right triangle below?



- 1)  $\sqrt{15}$
- 2) 8
- 3)  $\sqrt{34}$
- 4) 4

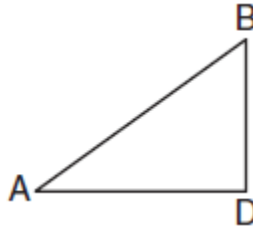
4 The end of a dog's leash is attached to the top of a 5-foot-tall fence post, as shown in the diagram below. The dog is 7 feet away from the base of the fence post.



How long is the leash, to the *nearest tenth of a foot*?

- 1) 4.9
  - 2) 8.6
  - 3) 9.0
  - 4) 12.0
- 5 The legs of an isosceles right triangle each measure 10 inches. What is the length of the hypotenuse of this triangle, to the *nearest tenth of an inch*?
- 1) 6.3
  - 2) 7.1
  - 3) 14.1
  - 4) 17.1

- 6 In the diagram below of  $\triangle ADB$ ,  $m\angle BDA = 90$ ,  $AD = 5\sqrt{2}$ , and  $AB = 2\sqrt{15}$ .

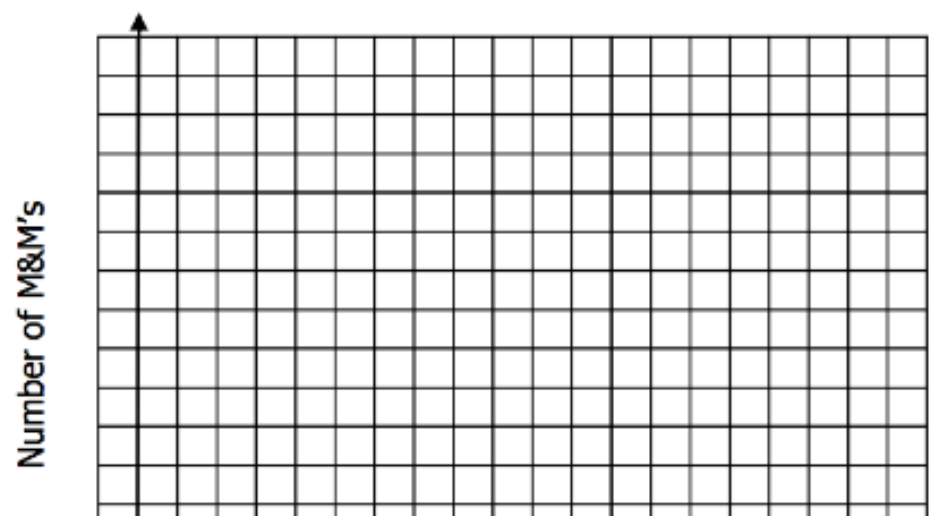


What is the length of  $\overline{BD}$ ?

- 1)  $\sqrt{10}$
  - 2)  $\sqrt{20}$
  - 3)  $\sqrt{50}$
  - 4)  $\sqrt{110}$
- 7 Which set of numbers does *not* represent the sides of a right triangle?
- 1) {6,8,10}
  - 2) {8,15,17}
  - 3) {8,24,25}
  - 4) {15,36,39}
- 8 The set of integers {3,4,5} is a Pythagorean triple. Another such set is
- 1) {6,7,8}
  - 2) {6,8,12}
  - 3) {6,12,13}
  - 4) {8,15,17}
- 9 Which set of numbers could be the lengths of the sides of a right triangle?
- 1) {10,24,26}
  - 2) {12,16,30}
  - 3) {3,4,6}
  - 4) {4,7,8}



4. Graph your data (scatterplot). The x-axis should represent the trial number and the y-axis should represent the number of M&Ms/cancer cells.



5. What is the y-intercept in the graph? What does the y-intercept represent in the context of the problem?

6. Will the graph ever cross the x-axis? Why or why not?

7. After you shook the cup and before you emptied them out on the plate/work surface, what percentage of M&Ms did you expect to land with the M facing up? **EXPLAIN YOUR REASONING.**

8. Calculate the actual percentage change between each trial, use the formula

$$\frac{\#M\&Ms \text{ in phase 1} - \#M\&Ms \text{ in phase 0}}{\#M\&Ms \text{ in phase 0}} = \frac{\text{new amount} - \text{old amount}}{\text{old amount}}$$





9. CALCULATE THE AVERAGE OF ALL THE PERCENTS: \_\_\_\_\_.

10. We can write an exponential growth function that models the above data. The formula that we will use for the model is  $y = C(1+r)^t$ .

The initial number of M&Ms:  $C =$  \_\_\_\_\_.

Rate of growth (calculated in #9)  $r =$  \_\_\_\_\_ (written as a decimal).

Time (the phase/trial number)  $t =$  # of the trial

Fill in the variables into the formula to get your exponential growth equation: