

FOR ALL STUDENTS  
TAKING COMMON CORE  
GEOMETRY

2018-2019

SUMMER REVIEW PACKET

CCHS MATH DEPARTMENT

Dear Student and Parent/Guardian,

The math department at Catholic Central High school wants you to be successful in CC Geometry. This summer packet is designed to help you review necessary skills. Be sure to follow the key information below when completing this packet:

- The packet is due when you return to school in September.
- **Every problem must be completed. None left blank.**
- The packet is worth 10 times a regular homework grade.
- Work must be shown to receive credit – no work, no points. Show the work on the packet pages. Do NOT add additional pages.
- Final answers must be shown on the answer pages at the back of the packet.
- A quiz covering the material from the packet may be given at the end of the first week of school. These topics also tie in with the first few units of CC Geometry.
- When you return in September, you will have an opportunity to ask questions. Math help will also be available during the first week.
- 

We hope that you have an enjoyable summer and return to school ready to be successful in CC Geometry.

## Solving Proportions

$$1) \quad \frac{n}{8} = \frac{12}{16}$$

$$2) \quad \frac{3}{k} = \frac{5}{15}$$

$$3) \quad \frac{18}{30} = \frac{y}{4}$$

$$4) \quad \frac{2.8}{4} = \frac{7}{x}$$

$$5) \quad \frac{8}{20} = \frac{30}{c}$$

$$6) \quad \frac{24}{n} = \frac{30}{100}$$

$$7) \quad \frac{1}{c+5} = \frac{2}{3}$$

$$8) \quad \frac{8}{b+10} = \frac{4}{2b-7}$$

$$9) \quad \frac{0.24}{a} = \frac{3}{9.6}$$

$$10) \quad \frac{17}{8.5} = \frac{z}{0.01}$$

$$11) \quad \frac{x+3}{4} = \frac{7}{8}$$

$$12) \quad \frac{n+12}{4} = \frac{n}{16}$$

## Simplifying Square Roots

Simplify each radical expression.

1) $\sqrt{289}$	2) $\sqrt{80}$
3) $\sqrt{845}$	4) $\sqrt{294}$
5) $\sqrt{12} \cdot \sqrt{28}$	6) $\sqrt{92} \cdot \sqrt{18}$
7) $\sqrt{50} \cdot \sqrt{80}$	8) $\sqrt{35} \cdot \sqrt{14}$

9) $\sqrt{24} \cdot \sqrt{26}$	10) $\sqrt{14} \cdot \sqrt{72}$
11) $\sqrt{196}$	12) $\sqrt{48}$
13) $\sqrt{500}$	14) $\sqrt{160}$
15) $\sqrt{18} \cdot \sqrt{15}$	16) $\sqrt{32} \cdot \sqrt{168}$

## Completing the Square

<b>Step 1:</b> Remember <i>a must be = 1</i> to use this method.	$x^2 - 6x + 2 = 0$
<b>Step 2:</b> <i>Isolate</i> $x^2 + bx$ on one side of the equal sign and the constant <b>c</b> on the other side.	$x^2 - 6x = -2$
<b>Step 3:</b> Take $\frac{1}{2}$ of the coefficient <b>b</b> of the <b>bx</b> term.	$x^2 - 6x + \left(\frac{6}{2}\right)^2 = -2 + \left(\frac{6}{2}\right)^2$
<b>Step 4:</b> <i>Square that result</i> and <i>add</i> that to <i>both sides</i> of the equation. <b>COMPLETE THE SQUARE.</b>	$x^2 - 6x + 3^2 = -2 + 9$
<b>Step 5:</b> Create (factor) a perfect square.	$(x - 3)^2 = 7$

1)  $p^2 + 14p - 38 = 0$

2)  $v^2 + 6v - 59 = 0$

3)  $a^2 + 14a - 51 = 0$

4)  $x^2 - 12x + 11 = 0$

5)  $x^2 + 6x + 8 = 0$

6)  $n^2 - 2n - 3 = 0$

7)  $x^2 + 14x - 15 = 0$

8)  $k^2 - 12k + 23 = 0$

## Equations of Lines

*Given Point and Slope:*

**Given  $m = -1$ ,  $(2, 1)$**

First, calculate  $b$  by substituting the slope and the coordinates into  $y = mx + b$ .

$$y = -1x + b$$

$$1 = -1(2) + b$$

$$1 = -2 + b$$

$$3 = b$$

$$y = -1x + 3$$

1.  $(4, -3)$ ,  $m = -1$

2.  $(-5, -6)$ ,  $m = 2$

3.  $(-7, 2)$ ,  $m = 3$

4.  $(3, 5)$ ,  $m = -2$

5.  $(6, -2)$ ,  $m = -3$

6.  $(5, -2)$ ,  $m = 2$

*Given Two Points:*

(3,4) and (5,8)

$$\frac{8-4}{5-3} = \frac{4}{2} = 2$$

1) Calculate Slope

2) Plug it into the slope intercept formula:  $y = mx + b$   
 $y = 2x + b$

3) Plug the x and y given in the question into the point slope formula

$$y = 2x + b$$

$$4 = 2(3) + b$$

4) Solve for b

$$4 = 6 + b$$

$$4 = 6 + b$$

$$\frac{-6 \quad -6}{-2 = b}$$

5) Rewrite equation with only slope and y-intercept

$$y = 2x - 2$$

1) through: (0, 3) and (-4, -1)

2) through: (0, 2) and (1, -3)

3) through: (-4, 0) and (1, 5)

4) through: (-4, -2) and (-3, 5)

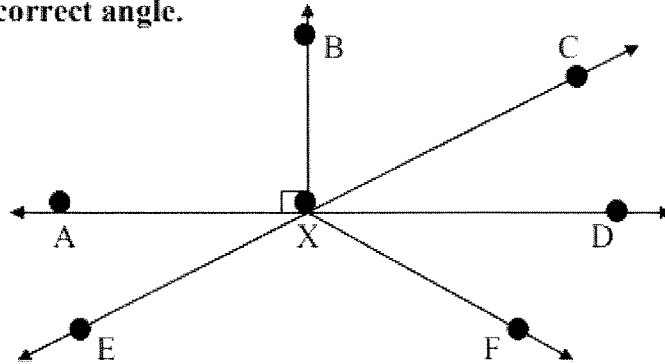
5) through: (5, 4) and (-4, 3)

6) through: (-4, 2) and (0, -5)



## Angle Relationships

A. Fill in the correct angle.



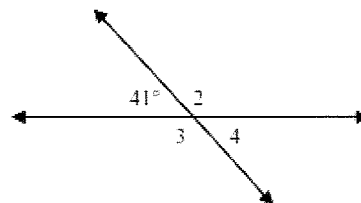
- 1)  $\angle AXE$  and \_\_\_\_\_ are vertical angles.
- 2)  $\angle AXF$  and \_\_\_\_\_ are supplementary angles.
- 3)  $\angle DXC$  and \_\_\_\_\_ are complementary angles.
- 4) \_\_\_\_\_ and  $\angle AXB$  are adjacent angles.
- 5) \_\_\_\_\_ and  $\angle CXD$  are supplementary angles.
- 6) \_\_\_\_\_ and  $\angle AXC$  are vertical angles.

B. Fill in the correct angle measurement.

- 7) What is the complement of an  $11^\circ$  angle? \_\_\_\_\_
- 8) What is the supplement of a  $92^\circ$  angle? \_\_\_\_\_
- 9) What is the complement of a  $56^\circ$  angle? \_\_\_\_\_

For #10 – 12, use the diagram to the right.

- 10)  $m\angle 2 =$  \_\_\_\_\_
- 11)  $m\angle 3 =$  \_\_\_\_\_
- 12)  $m\angle 4 =$  \_\_\_\_\_



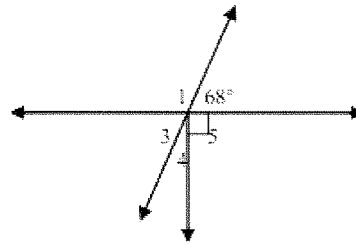
For #13 – 16, use the diagram to the right.

13)  $m\angle 1 =$  \_\_\_\_\_

14)  $m\angle 3 =$  \_\_\_\_\_

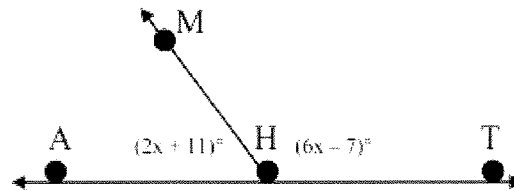
15)  $m\angle 4 =$  \_\_\_\_\_

16)  $m\angle 5 =$  \_\_\_\_\_

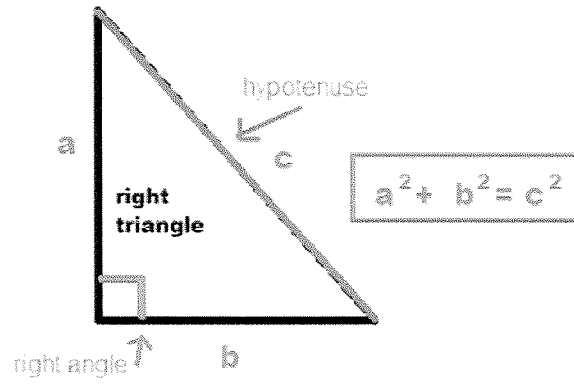


**C. Use your algebra skills to find the angle measurements.**

17) a) Find the value of "x".

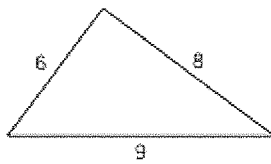


# Pythagorean Theorem

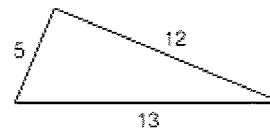


Do the following lengths form a right triangle?

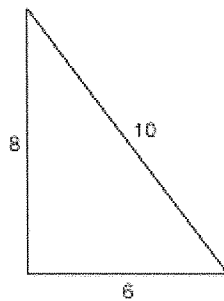
1)



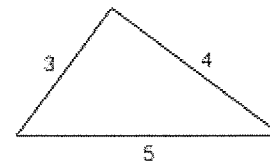
2)



3)



4)

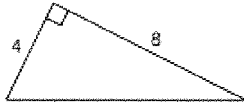


5)  $a = 6.4$ ,  $b = 12$ ,  $c = 12.2$

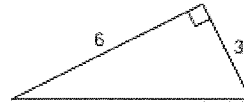
6)  $a = 2.1$ ,  $b = 7.2$ ,  $c = 7.5$

Find each missing length to the nearest tenth.

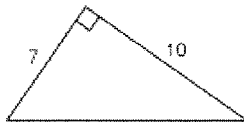
7)



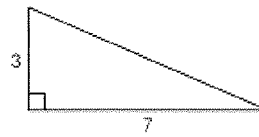
8)



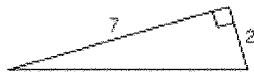
9)



10)



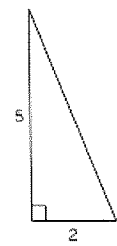
11)



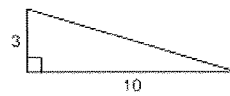
12)



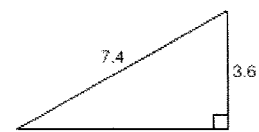
13)



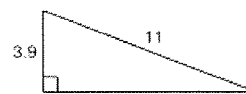
14)



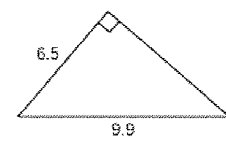
15)



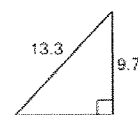
16)



17)



18)



## Distance Formula

### Distance Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

**Find the distance between each set of points. Express in simplest radical form.**

1) (1, 3), (5, 7)

\_\_\_\_\_

2) (-8, -9), (-4, -10)

\_\_\_\_\_

3) (10, 6), (1, -4)

\_\_\_\_\_

4) (3, 2), (8, 2)

\_\_\_\_\_

5) (9, -3), (-1, 8)

\_\_\_\_\_

6) (10, 0), (0, 4)

\_\_\_\_\_

7) (-7, -2), (6, 9)

\_\_\_\_\_

8) (-6, 5), (8, -3)

\_\_\_\_\_

## High School Math Reference Sheet

1 inch = 2.54 centimeters	1 kilometer = 0.62 mile	1 cup = 8 fluid ounces
1 meter = 39.37 inches	1 pound = 16 ounces	1 pint = 2 cups
1 mile = 5280 feet	1 pound = 0.454 kilogram	1 quart = 2 pints
1 mile = 1760 yards	1 kilogram = 2.2 pounds	1 gallon = 4 quarts
1 mile = 1.609 kilometers	1 ton = 2000 pounds	1 gallon = 3.785 liters
		1 liter = 0.264 gallon
		1 liter = 1000 cubic centimeters

Triangle	$A = \frac{1}{2}bh$
Parallelogram	$A = bh$
Circle	$A = \pi r^2$
Circle	$C = \pi d$ or $C = 2\pi r$
General Prisms	$V = Bh$
Cylinder	$V = \pi r^2 h$
Sphere	$V = \frac{4}{3}\pi r^3$
Cone	$V = \frac{1}{3}\pi r^2 h$
Pyramid	$V = \frac{1}{3}Bh$

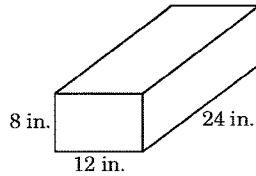
Pythagorean Theorem	$a^2 + b^2 = c^2$
Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Arithmetic Sequence	$a_n = a_1 + (n - 1)d$
Geometric Sequence	$a_n = a_1 r^{n-1}$
Geometric Series	$S_n = \frac{a_1 - a_1 r^n}{1 - r}$ where $r \neq 1$
Radians	1 radian = $\frac{180}{\pi}$ degrees
Degrees	1 degree = $\frac{\pi}{180}$ radians
Exponential Growth/Decay	$A = A_0 e^{k(t - t_0)} + B_0$

# Volume

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

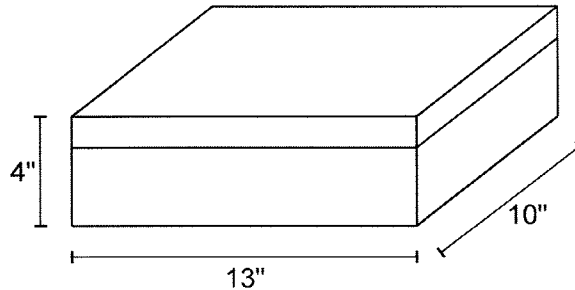
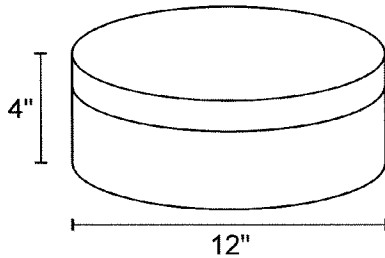
Date: \_\_\_\_\_

1. Good Times Candy wants to decrease its packaging costs. A diagram of its current package is shown.



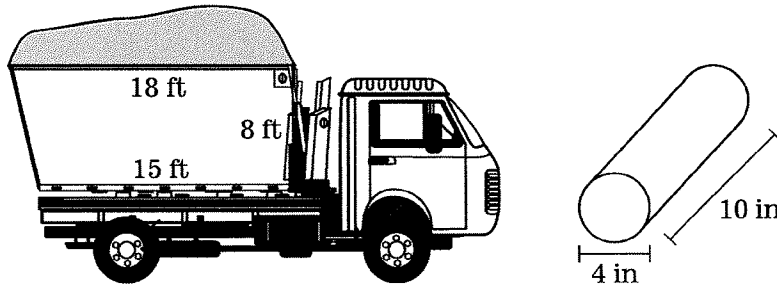
- What is the volume of the current box? Show all your calculations
- What is the surface area of the current box? Show all your work.
- Good times candy plans to lower their packaging cost by decreasing the surface area but keeping volume the same. What are possible box dimensions with the same volume but less surface area? Show all your calculations.

2. Nadia plans to make a keepsake box for her Senior year of High School. At the arts and crafts store she is considering two containers, a circular hat box and a rectangular box.



Nadia wants the box with the larger capacity. Which box should she choose? Show your calculations.

3. Rita is driving a load of firewood. In addition to the measurements shown in the diagram, the width of the truck is 6 feet. The wood is stacked about 2 feet over the top of the bin before it is covered with a tarp.



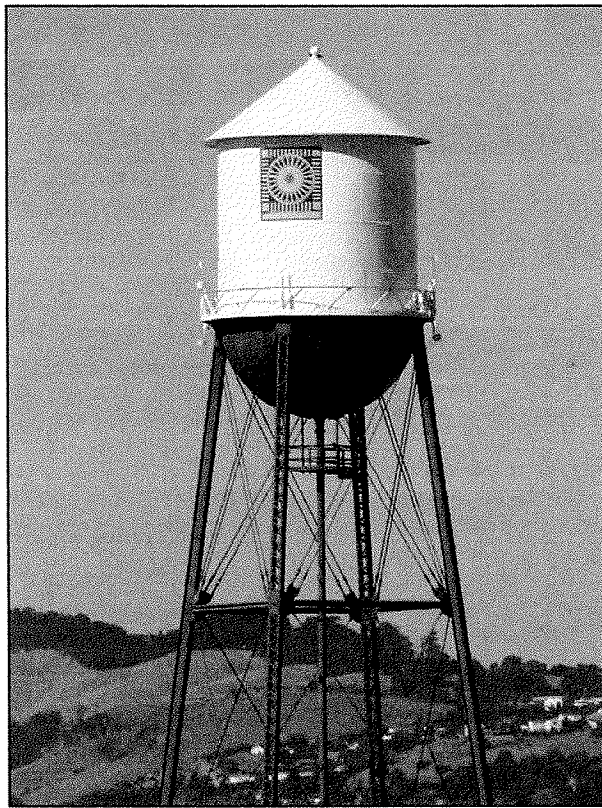
How would you estimate the number of logs that are in this load? What is your guess?

4. The volume of a right circular cylinder is  $v = \pi r^2 h$ . If the radius of a soup can is 2 inches, the height is 5 inches, and the soup is worth \$0.03 per cubic inch, find the value of the soup filling the can. Round answer to the nearest cent.
5. A cone has a height of 12 inches and a radius of 5 inches at its base.
- Find the volume of a similar cone if each of the dimensions is one-third that of the original cone. Round to the nearest hundredth of an inch.
  - If the height is doubled and the radius is halved, what happens to the volume?

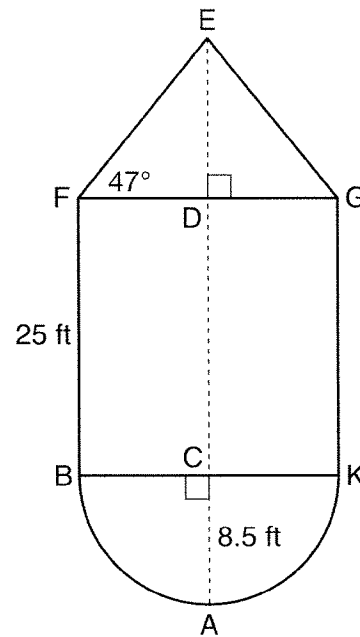


6. If the length of the radius of a sphere is multiplied by 4, what is the effect on the volume?

7. The water tower in the picture below is modeled by the two-dimensional figure beside it. The water tower is composed of a hemisphere, a cylinder, and a cone. Let  $C$  be the center of the hemisphere and let  $D$  be the center of the base of the cone.



Source: <http://en.wikipedia.org>



If  $AC = 8.5$  feet,  $BF = 25$  feet, and  $m\angle EFD = 47^\circ$ , determine and state, to the *nearest cubic foot*, the volume of the water tower.

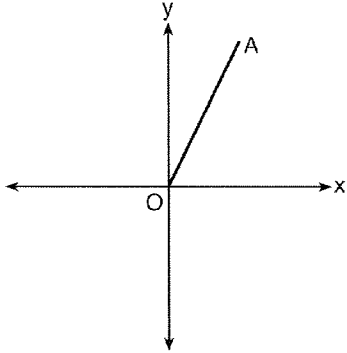
The water tower was constructed to hold a maximum of 400,000 pounds of water. If water weighs 62.4 pounds per cubic foot, can the water tower be filled to 85% of its volume and *not* exceed the weight limit? Justify your answer.

# Mixed Review

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

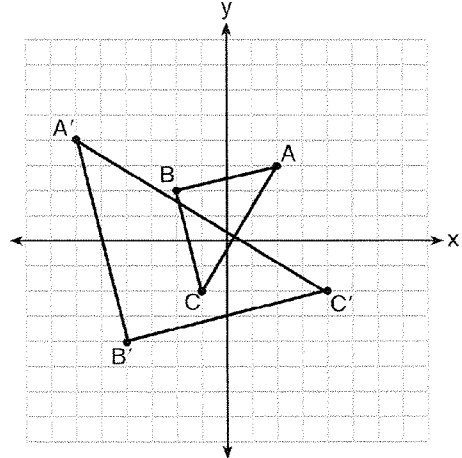
Date: \_\_\_\_\_

1. Which transformation of  $\overline{OA}$  would result in an image parallel to  $\overline{OA}$ ?



- A. a translation of two units down
- B. a reflection over the  $x$ -axis
- C. a reflection over the  $y$ -axis
- D. a clockwise rotation of  $90^\circ$  about the origin

2. Which sequence of transformations will map  $\triangle ABC$  onto  $\triangle A'B'C'$ ?

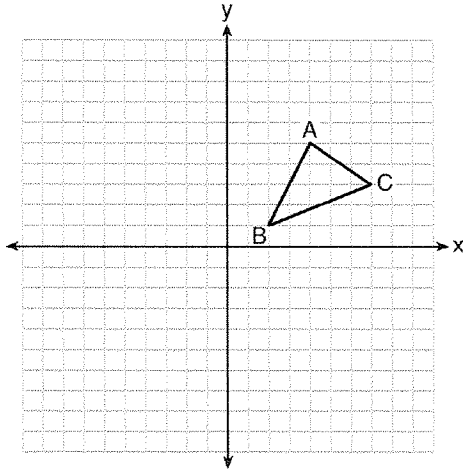


- A. reflection and translation
- B. rotation and reflection
- C. translation and dilation
- D. dilation and rotation

3. Line segment  $\overline{NY}$  has endpoints  $N(-11, 5)$  and  $Y(5, -7)$ . What is the equation of the perpendicular bisector of  $\overline{NY}$ ?

- A.  $y + 1 = \frac{4}{3}(x + 3)$
- B.  $y + 1 = -\frac{3}{4}(x + 3)$
- C.  $y - 6 = \frac{4}{3}(x - 8)$
- D.  $y - 6 = -\frac{3}{4}(x - 8)$

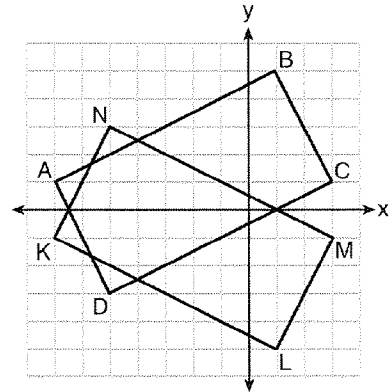
4. In the diagram below,  $\triangle ABC$  has vertices  $A(4, 5)$ ,  $B(2, 1)$ , and  $C(7, 3)$ .



What is the slope of the altitude drawn from  $A$  to  $\overline{BC}$ ?

- A.  $\frac{2}{5}$       B.  $\frac{3}{2}$       C.  $-\frac{1}{2}$       D.  $-\frac{5}{2}$

5. On the set of axes below, rectangle  $ABCD$  can be proven congruent to rectangle  $KLMN$  using which transformation?

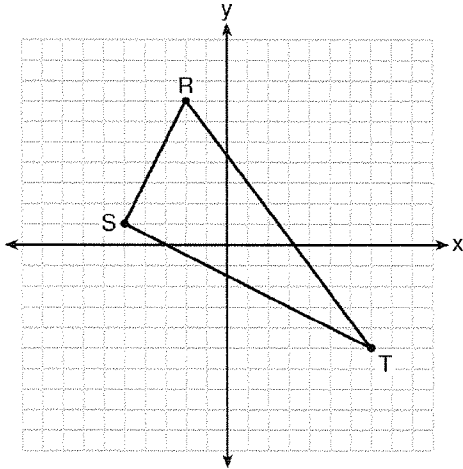


- A. rotation  
 B. translation  
 C. reflection over the  $x$ -axis  
 D. reflection over the  $y$ -axis

6. Seawater contains approximately 1.2 ounces of salt per liter on average. How many gallons of seawater, to the *nearest tenth of a gallon*, would contain 1 pound of salt?

- A. 3.3      B. 3.5      C. 4.7      D. 13.3

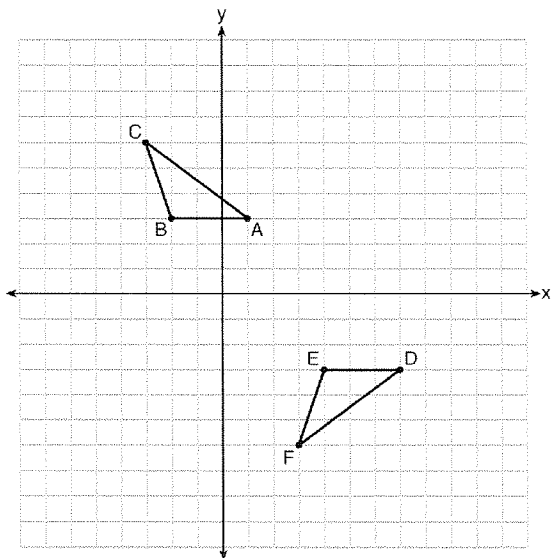
7. Triangle  $RST$  is graphed on the set of axes below.



How many square units are in the area of  $\triangle RST$ ?

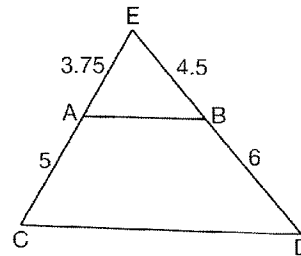
- A.  $9\sqrt{3} + 15$       B.  $9\sqrt{5} + 15$   
 C. 45      D. 90

8. Describe a sequence of transformations that will map  $\triangle ABC$  onto  $\triangle DEF$  as shown below.



9. Point  $P$  is on segment  $AB$  such that  $AP:PB$  is 4:5. If  $A$  has coordinates  $(4, 2)$ , and  $B$  has coordinates  $(22, 2)$ , determine and state the coordinates of  $P$ .

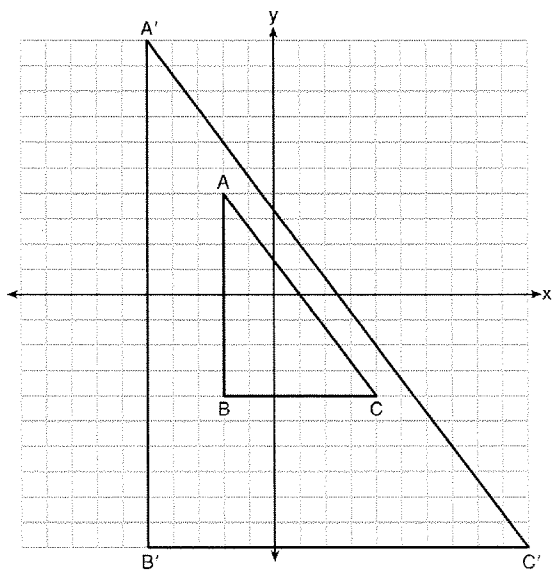
10. In  $\triangle CED$  as shown below, points  $A$  and  $B$  are located on sides  $\overline{CE}$  and  $\overline{ED}$ , respectively. Line segment  $AB$  is drawn such that  $AE = 3.75$ ,  $AC = 5$ ,  $EB = 4.5$ , and  $BD = 6$ .



Explain why  $\overline{AB}$  is parallel to  $\overline{CD}$ .

11. A barrel of fuel oil is a right circular cylinder where the inside measurements of the barrel are a diameter of 22.5 inches and a height of 33.5 inches. There are 231 cubic inches in a liquid gallon. Determine and state, to the *nearest tenth*, the gallons of fuel that are in a barrel of fuel oil.

12. In the diagram below,  $\triangle A'B'C'$  is the image of  $\triangle ABC$  after a transformation.



Describe the transformation that was performed.

Explain why  $\triangle A'B'C' \sim \triangle ABC$ .

**SOLVING PROPORTIONS**

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_
- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 10. \_\_\_\_\_
- 11. \_\_\_\_\_
- 12. \_\_\_\_\_

**SIMPLIFYING SQUARE ROOTS**

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_
- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 10. \_\_\_\_\_
- 11. \_\_\_\_\_
- 12. \_\_\_\_\_
- 13. \_\_\_\_\_
- 14. \_\_\_\_\_
- 15. \_\_\_\_\_
- 16. \_\_\_\_\_

**COMPLETING THE SQUARE**

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_
- 7. \_\_\_\_\_
- 8. \_\_\_\_\_

**EQUATIONS OF LINES**

*Given Two Points*

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_

**EQUATIONS OF LINES**

*Given Point and Slope*

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_

### ANGLE RELATIONSHIPS

1. \_\_\_\_\_

7. \_\_\_\_\_

13. \_\_\_\_\_

2. \_\_\_\_\_

8. \_\_\_\_\_

14. \_\_\_\_\_

3. \_\_\_\_\_

9. \_\_\_\_\_

15. \_\_\_\_\_

4. \_\_\_\_\_

10. \_\_\_\_\_

16. \_\_\_\_\_

5. \_\_\_\_\_

11. \_\_\_\_\_

17. \_\_\_\_\_

6. \_\_\_\_\_

12. \_\_\_\_\_

### PYTHAGOREAM THEOREM

1. \_\_\_\_\_

7. \_\_\_\_\_

13. \_\_\_\_\_

2. \_\_\_\_\_

8. \_\_\_\_\_

14. \_\_\_\_\_

3. \_\_\_\_\_

9. \_\_\_\_\_

15. \_\_\_\_\_

4. \_\_\_\_\_

10. \_\_\_\_\_

16. \_\_\_\_\_

5. \_\_\_\_\_

11. \_\_\_\_\_

17. \_\_\_\_\_

6. \_\_\_\_\_

12. \_\_\_\_\_

18. \_\_\_\_\_

### DISTANCE FORMULA

1. \_\_\_\_\_

5. \_\_\_\_\_

2. \_\_\_\_\_

6. \_\_\_\_\_

3. \_\_\_\_\_

7. \_\_\_\_\_

4. \_\_\_\_\_

8. \_\_\_\_\_

### VOLUME

1. A) \_\_\_\_\_

6. \_\_\_\_\_

B) \_\_\_\_\_

7. \_\_\_\_\_

C) \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. A) \_\_\_\_\_

B) \_\_\_\_\_

## MIXED REVIEW

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_

10. \_\_\_\_\_

11. \_\_\_\_\_

12. \_\_\_\_\_