

7th Grade Assignment – Week #29

Group Assignments:

For Tuesday:

- Do **Geometry – Sheet #3**: problems #1-4
- 1) *Puzzle!* What are the only numbers that are composite (not prime), less than 100, and are not a multiple of 2, 3 or 5?
 - 2) *Puzzle!* Christine is 7 years younger than twice as old as Karen. Karen is 6 years younger than Christine was when she (Christine) was 3 times as old as Karen. How old are they now?

For Thursday:

- Do **Square Root Algorithm – Sheet #4**: problems #1a and 1b
- Do **Geometry – Sheet #3**: problem #5
- (If you still have time) Do **Square Root Algorithm – Sheet #4**: problems #1c and 1d

Individual Work

- Do as much as you can with **Rates – Sheet #3**, problems #1-14
- Finish any of the group assignment problems (above) that you didn't get to in your group meeting.

Rates – Sheet #3

- 1) How long does it take a train to travel 238 miles at 85 mph?
- 2) How far do you cycle in 3 hours and 40 minutes at 15 mph?
- 3) Frank went 28 miles in 3 hours in his boat. What was his average speed?
- 4) How long does it take a plane to fly 500 miles at 625 mph?
- 5) Vicky's car gets 32 mpg (miles/gal) on the highway. How far can she drive on 11 gallons of gas?
- 6) Beverly earned \$2880 last month in a total of 128 hours. What is her hourly wage?
- 7) Mary rows a boat at an average of 2 mph. If it takes her 45 minutes to cross a lake, then how wide is the lake?
- 8) Karen works 40 hours per week at \$15/hr. What is her annual salary? (Assume that she takes two weeks unpaid vacation per year.)
- 9) Martha started her bike trip by going up a 10-mile hill in 2 hours, then going down a 6-mile hill in 10 minutes. She then finished by biking along a $22\frac{1}{2}$ -mile flat stretch in one hour and 20 minutes. What was her average speed...
 - a) Going up the hill?
 - b) Going down the hill?
 - c) Going on the flats?
 - d) For the whole trip?

10) Jean went 40 miles in the first hour, 30 miles in the second hour, and 50 miles in the third hour. What was the average speed for the trip?

11) A train went 50 miles in the first hour, and then 110 miles in the second hour. What was the average speed for the trip?

12) A train went 50 miles in the first hour, and then went 110 mph for the second, third and fourth hours. What was the average speed for the trip?

13) A train went 50 miles in the first hour, and then went 330 miles over the next three hours. What was the average speed for the trip?

14) What is your average speed (in mph) if you run a mile in 4 minutes?

Mental Math

15) Cross multiply.

$$\begin{array}{r} 62 \\ \times 57 \\ \hline \end{array}$$

16) $13 \cdot 29 =$

17) $0.022 \div 4 =$

18) $0.63 \cdot 10 =$

19) $15 \cdot 440 =$

20) $109 \cdot 112 =$

21) $315 \div 35 =$

22) $103 \cdot 104 =$

23) The ratio in a circle.

a) Give each of the four ratios in a circle.

b) Find the circumference of a circle that has a diameter of 28ft.

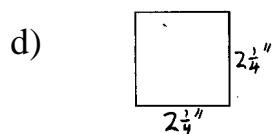
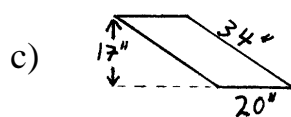
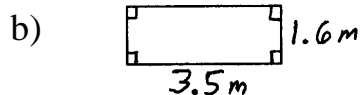
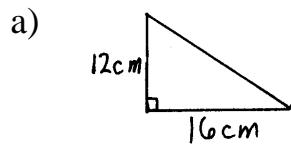
c) Find the circumference of a circle that has a diameter of 8.3m.

d) Find the diameter of a circle that has a circumference of 44ft.

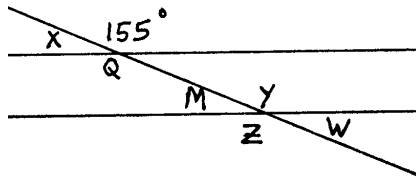
e) Find the diameter of a circle with a circumference of 5cm.

Geometry – Sheet #3

1) Find the area.



2) Use this drawing to answer the following questions.



a) Find each variable.

b) Z and W are _____ angles.

c) Z and Y are _____ angles.

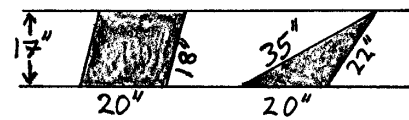
d) Z and Q are _____ angles.

e) Q and M are _____ angles.

f) Q and Y are _____ angles.

g) X and M are _____ angles.

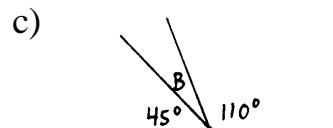
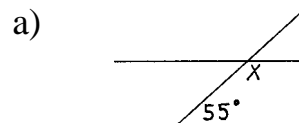
3) Find the area and perimeter of...



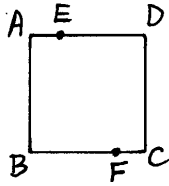
a) The parallelogram.

b) The triangle.

4) Find each variable.



- 5) ABCD is a square with 16cm sides. AE and FC both equal 4cm.



- Find the area of the square ABCD.
- Find the area of the triangle ABC.
- Find the area of the triangle EBC.
- Find the area of the triangle ABF.
- Find the area of the triangle EBF.
- Find the area of the triangle DBF.
- Find the area of the trapezoid ABCE.
- Find the area of the trapezoid ABFE
- Find the length of line segment AF.

- 6) On a separate sheet, use a compass, straightedge, and protractor to construct a triangle having angles A, B, and C, such that it has the given angle measurements. Then, calculate the degree measures of the missing angle(s). Lastly, check your calculations by measuring those missing angles with a protractor.

a) $\angle A = 90^\circ$ and $\angle B = 65^\circ$
 $\angle C =$

b) $\angle A = 15^\circ$ and $\angle B = 20^\circ$
 $\angle C =$

c) All angles are equal.
 $\angle A = \angle B = \angle C =$

- d) An isosceles triangle where the angle contained by the two equal sides is 100° .

$\angle A = 100^\circ$

$\angle B =$

$\angle C =$

Mental Math

7) $93 \cdot 97 =$

8) $5.2 \div 10000 =$

9) $59 \cdot 11 =$

10) $52^2 =$

11) $7 \cdot 9999 =$

12) $3.2 \div 4 =$

13) $1800 \div 3000 =$

14) $6400 \div 4 =$

Review

15) $0.007 \text{ kg} = \text{ ______ } \text{ mg}$

16) $72 \text{ fl.oz.} = \text{ ______ } \text{ c}$

- 17) A train went 80 miles in the first hour, and then went 210 miles over the next three hours. What was the average speed over the four hours?

- 18) A car used 2.3 gallons of gas in 60 miles. What was its fuel efficiency (in mpg) for the trip?

- 19) What is 4000 increased by 63%?

√ Algorithm – Sheet #4

1) Calculate each square root using the *Long Algebraic Method*, using the method shown on the previous worksheet. (All answers work out exactly.)

a) $\sqrt{2025}$ b) $\sqrt{361}$ c) $\sqrt{7056}$ d) $\sqrt{4356}$

The Long Algebraic Method (for larger answers)

- For square roots that have answers with more than two digits, we need to do the same procedure as above, but repeat the process a number of times.
- Keep in mind that the **a** values are the digits that we are certain of at a given point, and the **b** values are the digits that we are trying to figure out.
- **Notation:** a_1 means the value of **a** (with one correct digit) for the first time through the process.
 a_2 means the value of **a** (with two correct digits) for the second time through the process.
 a_3 means the value of **a** (with three correct digit) for the third time through the process.
 The values of **b** are similarly given as b_1, b_2, b_3 , etc.

Example: Calculate $\sqrt{7203856}$.

Step #1 We know the answer has 4 digits, and the first digit is 2 (because $\sqrt{7}$ is between 2 and 3), so $a_1 = 2000$, and we use the identity $n - a_1^2 = b_1(2a_1 + b_1)$, where $2a_1 = 4000$.

$$\begin{array}{r} n \quad 7203856 \\ a_1^2 \quad - 4000000 \quad (\text{because } 2000^2 = 4000000) \\ \hline n - a_1^2 \quad 3203856 = b_1(4000 + b_1), \text{ where } b_1 \text{ is the 100's place (e.g. 300, 400, etc.)} \end{array}$$

$b_1 = 600$ because 700 is too big,
which means $b_1(2a_1 + b_1) = 2760000$

Step #2 We now know that the first two digits are 2 and 6, so $a_2 = 2600$, and we use the identity $n - a_2^2 = b_2(2a_2 + b_2)$, where $2a_2 = 5200$.

$$\begin{array}{r} n \quad 7203856 \\ a_2^2 \quad - 6760000 \quad (\text{because } 2600^2 = 6760000) \\ \hline n - a_2^2 \quad 443856 = b_2(5200 + b_2), \text{ where } b_2 \text{ is the tens' place (e.g. 30, 40, etc.)} \end{array}$$

$b_2 = 80$ because 90 is too big,
which means $b_2(2a_2 + b_2) = 422400$

Step #3 We now know that the first three digits are 2, 6, and 8, so $a_3 = 2680$, and we use the identity $n - a_3^2 = b_3(2a_3 + b_3)$, where $2a_3 = 5360$.

$$\begin{array}{r} n \quad 7203856 \\ a_3^2 \quad - 7182400 \quad (\text{because } 2680^2 = 7182400) \\ \hline n - a_3^2 \quad 21456 = b_3(5360 + b_3), \text{ where } b_3 \text{ is the ones' place (e.g. 3, 4, etc.)} \end{array}$$

$b_3 = 4$, which means $b_3(2a_3 + b_3) = 21456$,

which means that our final answer is *exactly* **2684**.

2) Calculate each square root using the Long Algebraic Method. It is important that you do the problem and organize your work exactly like the example given above. (All answers work out exactly.)

a) $\sqrt{285156}$ b) $\sqrt{71289}$ c) $\sqrt{524176}$ d) $\sqrt{767376}$