7th Grade Assignment – Week #28

<u>Group Assignments</u>:

For Tuesday:

- Do **Square Root Algorithm – Sheet #3**: problems #1, 2
- Do **Geometry – Sheet #2**: problems #1-5

For Thursday:

- Do **Geometry – Sheet #2**: problems #6-10
- Do **Square Root Algorithm – Sheet #3**: do as many problems as you can from #3.

<u>Individual Work</u>

- Do as much as you can with **Rates – Sheet #2**, problems #1-13
- Finish any of the group assignment problems (above) that you didn't get to in your group meeting.

Rates − Sheet #2

1) Bill earns $7.75/hr.
  a) What does he earn in a week, if he works 25 hours per week?

  b) How long does he have to work in order to earn $434?

2) What is Beth's hourly salary if she earns $336 in a 35-hour workweek?

3) Mark earns $8.25/hr at Cathy's Diner and $9.60/hr at a bank. How much does he earn in a week if he works 12 hours at the diner and 22 hours at the bank?

4) How long does it take Bob to bike 65 miles at 13 mph?

5) John biked 11¼ miles in 45 minutes. What was his average speed?

6) How many minutes does it take to skate 3½ miles at 12 mph?

7) What is Mike's average speed if he goes 43 miles in 5 hours?

8) What is the fuel efficiency (in mpg – miles per gallon) of Mark's moped if it uses 1.4 gallons in 200 miles?

9) How far does a bus travel in 5 hours at a rate of 48 mph?

10) How far does Kelsey run in 20 minutes at a rate of 3.2 m/s?

11) How far does Peter walk in 1½ hours at a rate of 3⅔ mph?

12) Dan left his house at 1:55pm to drive to Tom's house, 176 miles away. If he drove at an average speed of 55 mph, then at what time did he arrive at Tom's house?

13) *Challenge!* Bill lives in Denver. He made 12 trips to Boulder and 9 trips to Colorado Springs, each time on the bus. The bus's average speed was always 50 mph, and the distance from Denver to Colorado Springs is 70 miles, and Denver to Boulder is 28 miles. What was the total amount of time Bill spent riding buses?

Mental Math
14) Cross multiply.

a) 34
   x 56

b) 58
   x 98

15) $12 \cdot 61 =$

16) $61^2 =$

17) $23 \cdot 9999 =$

18) $2700 \div 3600 =$

19) $32 \cdot 5 =$

20) $9300 \div 5 =$

Review
21) The ratio in a square.

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

b) Find the length of the side of a square that has a 56ft diagonal.

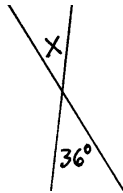c) Find the length of the diagonal of a square that has a 4ft side.

d) Find the length of the diagonal of a square that has a 85ft side.

e) Find the length of the side of a square that has a 6ft diagonal.
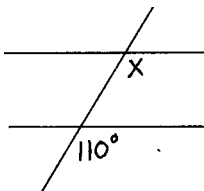
Geometry − Sheet #2

On all of the sheets in this unit, assume that lines are parallel if they appear to be so.
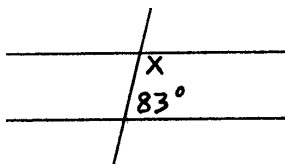
1) a) Find X.

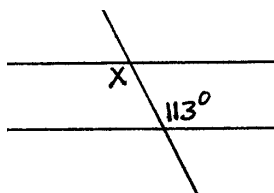b) The two labeled angles are _____ angles.

2) a) Find X.

b) The two labeled angles above are _____ angles.

3) a) Find X.
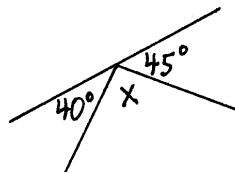
b) The two labeled angles above are _____ angles.
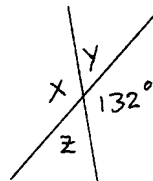
4) a) Find X.

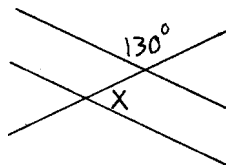b) The two labeled angles above are _____ angles.

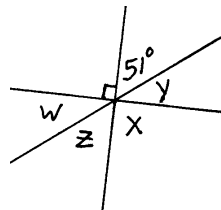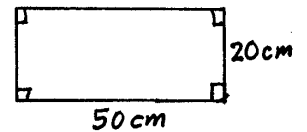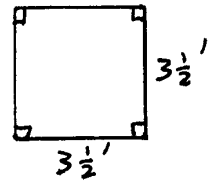5) Find each variable.

a)

b)

c)

d)

6) Give the dimensions of three different triangles that each have an area equal to 24 square feet.

7) Find the area and perimeter.
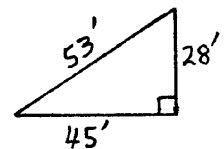
a)

b)

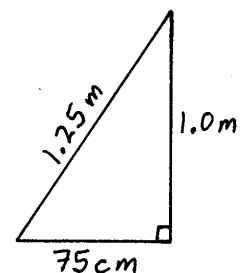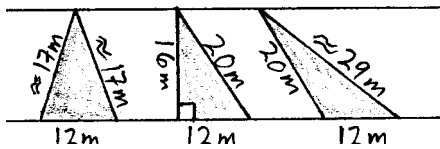c)

d)

8) Find the area of both the rectangle and the parallelogram.

15' ... 17'
18' ... 18'

9) Find the area of the three triangles, below, given that the middle one is a right triangle.

≈17m ≈17m 16m 20m 20m ≈29m
12m ... 12m ... 12m

10) Explain the Pythagorean Theorem to an adult.

Notes for the adult:
- The formula $c^2 = a^2 + b^2$ is not used until 8th grade.
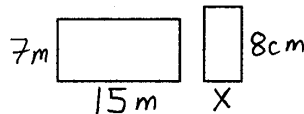- Please comment on the student's explanation in the space below.

Mental Math

11) Cross multiply.

$$\begin{array}{r} 85 \\ \times\ 24 \\ \hline \end{array}$$

12) $53 \cdot 47 =$

13) $36 \cdot 25 =$

14) $45 \cdot 18 =$

15) $68 \cdot 72 =$

16) $320 \cdot 5 =$

17) $56000 \div 800 =$

18) $54^2 =$

Review

19) Find X given that the two rectangles are similar.

7m [ ] 15m ... 8cm [ ] X

20) At a rate of 12 mph, how far do you cycle in 2 hours and 45 minutes?

21) Hairy Kennel has 140 dogs and 220 cats…

a) Give the ratio of dogs to cats in whole number form.

b) Give the three thoughts associated with the above ratio.

c) Give the ratio of dogs to cats in decimal form.

d) Give the two thoughts associated with the above ratio.

e) The other kennel in town has the same ratio of dogs to cats. If that kennel has 126 dogs and cats combined, then how many are dogs and how many are cats?

$\sqrt{}$ Algorithm − Sheet #3

1) For each of the below problems, state the number of digits that the answer will have (before the decimal point), and the first digit of the answer. *Do not calculate what the square root is equal to.* (If you need help, then look at the previous worksheet.)

a) $\sqrt{7384}$ has ___ digits; The first digit is ___.

b) $\sqrt{67482}$ has ___ digits; The first digit is ___.

c) $\sqrt{985035}$ has __ digits; The first digit is ___.

d) $\sqrt{803}$ has ___ digits; The first digit is ___.

e) $\sqrt{9670564}$ has __ digits; The first digit is ___.

2) Calculate by using the Squaring Formula (see previous worksheet).

a) 57^2

b) 14^2

c) 95^2

The Long Algebraic Method (for two-digit answers)

Example: Calculate $\sqrt{6889}$.

Solution: Here n = 6889. We know that its square root has 2 digits, and that the first digit is 8 (because $\sqrt{68}$ is between 8 and 9). We call our first estimate of the answer a, and in this case $a = 80$. The second digit we call b.

Here is the procedure:

Using the square root identity

$$n - a^2 = b(2a + b)$$

(which comes from $\sqrt{n} = a + b$)

We put in n = 6889 and a = 80 we get:

$$6889 - 80^2 = b(2 \cdot 80 + b)$$
$$6889 - 6400 = b(160 + b)$$
$$489 = b(160 + b)$$

Now we determine b (the answer's second digit). We try different single digit values for b to see what works.

For example,
for b = 2, then we do $16\underline{2} \cdot \underline{2}$;
for b = 5, then we do $16\underline{5} \cdot \underline{5}$,

hoping that one of them will be equal to (or just under) 489. It turns out that b = 3 works ($16\underline{3} \cdot \underline{3} = 489$). Therefore, our answer is **83**. (Since $163 \cdot 3$ is exactly 489, we know that our answer is exact. We can check our answer by squaring 83 to get exactly 6889.)

3) Calculate each square root using the Long Algebraic Method. It is important that you do the problem and organize your work on a separate sheet exactly like the example just given. (All answers work out exactly.)

a) Calculate $\sqrt{3249}$

b) Calculate $\sqrt{5329}$

c) Calculate $\sqrt{784}$

d) Calculate $\sqrt{8464}$