7th Grade Assignment – Week #11

Individual Work

- As much as you can with the following:
  Ratios (Part I) Sheet #1: Problems #1-3, 7-14. #5 is optional.
  Ratios (Part I) Sheet #2: Problems #6-19

- The **Measurement Test** is found below. Things to keep in mind regarding the test:
  - The parent should give the test to the student – to be taken by the end of this week.
  - In preparation for the test, the student should know that it may include questions similar to or related to any of the problems that appeared on the sheets in the workbook.
  - The student should not use notes or the workbook during the test.
  - The student should not see the test until he/she is ready to take it.
  - The student may take as much time as needed.
  - After the student has completed the test, the parent should send a photo of the test to the tutor. The tutor should then indicate which problems are not correct, and then the student should correct those mistakes and send it back to the tutor.

(Note that the group assignment is on the next page.)

Group Assignment: (for both Tuesday and Thursday) Game! **Skedoodle**

This game was demonstrated in today's lecture. You should practice playing it in your group. The game works best for either 2 or 3 players, so if you have a four-person group, you can divide into two groups of two.

Here are the rules:

Getting Started. Before the game, the players agree on two things: the "magic digit", and the range of allowable numbers. The magic digit can be any whole number between 3 and 9. The range of allowable numbers can be anything the players want up to 99.

Objective. The object of the game is to score the most points. You score a single point by creating a "scoring number", and you score two points if you make the final move of the game (i.e., the player following you cannot create a number in the allowable range).

Scoring.

- Your number is a scoring number if it has the magic digit in it.
- Your number is a scoring number if you can add, subtract, divide or multiply the digits to produce the magic digit.

Moving. When it's a player's turn, he/she creates a new number by doing one of the following to the current number:

- doubling the number.
- halving the number.
- squaring the number.
- or taking the number's square root.
- (if the current number is a 2-digit number) manipulating the digits by +, –, x, or ÷.

Other Rules

- The new number created must be a whole number that has not been used yet in the game.
- The number 1 is a special case; it can be used to move to any other number in the range.
- The first player begins by choosing any number in the allowable range, provided it is not a scoring number.
- Play continues until a player is stuck because there are no possible moves.
- This game invites rule tinkering. You may wish to incorporate this common variation: allow a move by adding or subtracting 4 to the current number.
- Players can play to a certain number of points over several games.

Example Game

Magic Digit: 6 Range: 1-30 Number of Players: 3

Player 1: 3
Player 2: Moves to 6 by doubling. (Scores 1 point because number contains magic digit.)
Player 3: Moves to 12 by doubling.
Player 1: Moves to 24 by doubling. (Scores 1 point because digit addition on 24 gives 6.)
Player 2: (Note that this player cannot move to 6 because that number has already been used.) Moves to 8 by digit multiplication.
Player 3: Moves to 4 by halving.
Player 1: Moves to 16 by squaring. (Scores 1 point because number contains magic digit.)
Player 2: Moves to 7 by addition.
Player 3: Moves to 14 by doubling. (Only move)
Player 1: Moves to 5 by digit addition.
Player 2: Moves to 25 by squaring.
Player 3: Moves to 10 by digit multiplication.
Player 1: Moves to 1 by digit addition.
Player 2: Moves to 26 by special 1 rule. (Scores 1 point because number contains magic digit.)
Player 3: Moves to 13 by halving. (Only move)
Player 1: Moves to 2 by digit subtraction. (Only move. Scores two points since now Player 2 has no allowable moves.

Final Score**:** Player 1= 4 pts; Player 2 = 2 pts; Player 3 = 0 pts

Measurement Test Name:_____

1) 39 cm = _____m

2) 12 gal = _____qt

3) 4.9ℓ = _____mℓ

4) 2 lb = _____ oz

5) 630cm = _____m

6) 6 qt = _____gal

7) 0.87ℓ = _____mℓ

8) 20 oz = _____lb

9) 900mg = _____kg

10) 3½ yd = _____ft

11) 0.79mm = _____cm

12) 400 fl.oz. = _____qt

13) 0.05km = _____m

14) 1½ ton = _____oz

15) 0.62mℓ = _____ℓ

16) 100 mi = _____ft

17) 49m = _____mm

18) 6 pt = _____gal

19) 1.43km = _____mm

20) 5¾ c = _____fl.oz.

21) A rope is 7.4m long. If you cut off 25cm from each end, and then divide the remainder into ten equal segments, how long (in cm) is each of the resulting segments?

22) A wooden box weighs 2.7kg when empty. How much does it weigh (in kg) if it is filled with 2000 marbles each weighing 800mg?

Ratios, Part I – Sheet #1

1) Find the ratio of *milk to water*.

a) 4 cups of milk and 6 cups of water.

b) 6 cups of milk and 4 cups of water.

c) 6 cups of water and 4 cups of milk.

d) 2 quarts of milk and 3 pints of water.

e) 2 quarts of water and 28 fl. oz. of milk.

f) 240 mℓ of milk and 180 mℓ of water.

2) What is the ratio of Jane's to Larry's to Kevin's money if they have $240, $320, and $440, respectively?

3) For each problem, give the ratio of *Bill to Mary*.

a) What is the ratio of their weights if Bill weighs 160 pounds and Mary weighs 140 pounds?

b) What would the ratio of their weights be if they were weighed in kilograms?

c) What is the ratio of their heights if Bill is 5'4" tall and Mary is 5'8" tall?

d) What would the ratio of their heights be if they were measured in meters?

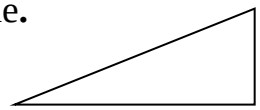
e) What is the ratio of their salaries if Bill gets paid $10/hr and Mary gets paid $300/week. (Both of them work 40 hours per week.)

4) At Eastman Elementary School everyone plays either baseball or golf. Which grades have equal ratios?

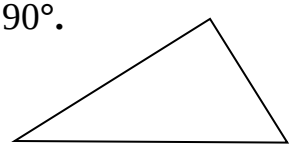
- In first grade, 18 play baseball and 12 play golf.
- In second grade, 10 play baseball and 8 play golf.
- In third grade, 15 play golf and 12 play baseball.
- In fourth grade, 12 play golf and 15 play baseball.
- In fifth grade, 13 play baseball and 9 play golf.
- In sixth grade, 15 play baseball and 10 play golf.

5) Redraw each figure according to the given instructions. Each drawing should be sketched carefully by hand, but without a ruler.

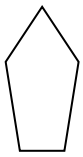
a) Make the triangle 75% as large, mirror it about a horizontal line.



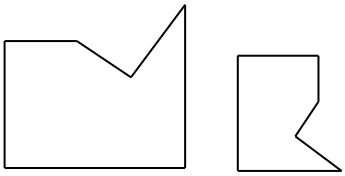
b) Make the triangle 40% as large, mirror it about a vertical line, and rotate it clockwise by 90°.



c) Make the figure 150% as large, mirror it about a horizontal line, and rotate it clockwise by 180°.



6) With the previous problems, you had to reduce or enlarge a figure. If we put a figure in a photocopier and reduce or enlarge it, then the resulting figure and the original figure are said to be *similar* to one another, such as these two figures here:



What can we say that is true about any pair of similar figures?

Mental Math

7) $15 \cdot 70 =$

8) $220 \cdot 15 =$

9) $14 \cdot 15 =$

10) $90 \div 25 =$

11) $75^2 =$

12) $25 \cdot 360 =$

13) $225 \cdot 4 =$

14) $7024 - 2989 =$

Review

15) 0.6 cm = _____km

16) 5280 yd = ____mi

17) 40 fl.oz. = _____pt

18) 1.3 km = _____cm

19) $\dfrac{6\frac{2}{3}}{4}$

20) $\dfrac{48}{49} \cdot \dfrac{35}{36}$

21) Division. Leave the answer as an exact decimal (perhaps repeating).
$0.9218 \div 0.006$

22) $(0.0052)^2$

Ratios, Part I – Sheet #2

1) Janet is 4'6" tall and weighs 80 lb, and Maria is 5'0" tall and weighs 120 lb.
   a) What is the ratio of Maria's weight to Janet's weight?
   b) What is the ratio of Janet's weight to Maria's weight?
   c) What is the ratio of Janet's height to Maria's height?

2) Reduce each ratio.
   a) 10:5
   b) 15:25
   c) 6:10
   d) 36:4
   e) 84:108
   f) 1716:1584

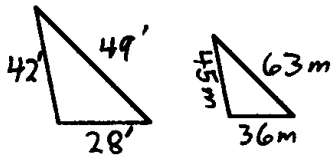
3) What is the ratio of *water to flour* in a recipe that calls for…
   a) 1 pint of water and 3 cups of flour?
   b) 5 eggs, 10 cups of flour and 4 cups of water?
   c) 5 cups of water, 1 cup of milk and 2 cups of flour?
   d) 2½ cups of flour and 20 fl. oz. of water?

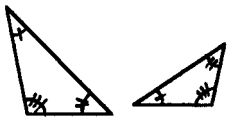
4) Proportions as a fraction.
   a) 8 is what proportion of 24?
   b) 200 is what proportion of 500?
   c) 35 is what proportion of 56?
   d) 4 is what proportion of 7?
   e) 8 is what proportion of 5?

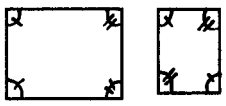
5) What can be said about any two similar figures?

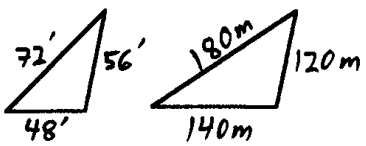
6) Is each statement *true* or *false*?
   a) All squares are similar.
   b) All rectangles are similar.
   c) All pentagons are similar.
   d) All regular pentagons are similar.
   e) All circles are similar.

7) State whether each pair of figures is *definitely* similar or not. (Not drawn to scale.)

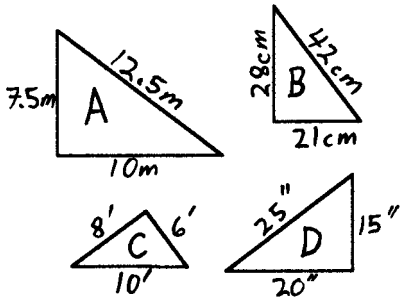
a) 

b) 

c) 

d) 

8) Which one of these triangles is *not* similar to the others? (Not drawn to scale.)



The Three Thoughts of a Ratio

What does it mean to say that the ratio of guavas to bananas is 5 to 3?

G:B = 5:3

We can associate three thoughts with the above ratio:

1. **3G = 5B**
   In words, this means that 3 times the number of guavas is equal to 5 times the number of bananas.
2. **$B = \frac{3}{5} G$**
   In words, this means that the number of bananas is equal to $3/5$ the number of guavas.
3. **$G = \frac{5}{3} B$**
   In words, this means that the number of guavas is equal to $5/3$ the number of bananas.

We will use these three "thoughts" to solve ratio problems.

Example: The ratio of guavas to bananas in a group is 5 to 3. How many guavas are there, if there are 21 bananas?

Solution (for seventh grade)**:** We first think of the three thoughts given above, and then recognize that the third one will help us in finding the answer to the question because it tells us how to calculate the number of guavas. Specifically, it says that the number of guavas is $5/3$ of the number of bananas. So we do $5/3$ times 21 to get an answer of 35.

Note: This method of solving the problem requires a good understanding of what a ratio is. The typical algebraic solution (i.e. G is to 21 as 5 is to 3), which has us set up the equation $\frac{G}{21} = \frac{5}{3}$ requires no real understanding of ratios, and is therefore not done until eighth grade.

9) Bill has $360 and Jack has $450.
   a) What is the ratio of Bill's money to Jack's money?

   b) What are the three thoughts associated with this ratio? Write each thought both as an equation and as a sentence.

10) The ratio of Jeff's money to Patty's money is 2 to 3. (J:P = 2:3) How much money does Jeff have if Patty has $78? (Hint: See the example.)

Mental Math

11) $15 \cdot 180 =$

12) 15% of 240 =

13) 15% of 62 =

14) $120 \div 25 =$

15) $4000 \div 25 =$

16) $95^2 =$

17) $287 \div 999 =$

18) $13000 \div 5 =$

Review

19) Is 36,082,717 evenly divisible by 11?