

8th Grade Assignment – Week #31

Individual Work

- See how far you can get with **Year-End Review - Practice Sheets #1 and #2**. There is a lot here. You don't have to do all of it. Focus on the problems that you think would be most helpful for you.

Group Assignments:

For Tuesday

1) *Factors and Remainders.*

In Monday's lecture, I posed a question at the end: What is an efficient way to find the GCF (greatest common factor) of two large numbers? The two numbers were 840 and 1500.

The obvious way to do this is to list all the factors of each number and then simply see what the largest common factor is. However, for such large numbers, this can be very tedious.

Your task: Complete the below table. As you do this, try to figure out how you can easily look at the prime factorization and determine the GCF of the two given numbers. (Note that I will give the answer to this during Wednesday's lecture.)

The two numbers	Prime Factorizations	GCF
18, 27	$2 \cdot 3^2$; 3^3	9
8, 20	2^3 ; $2^2 \cdot 5$	4
32, 40	2^5 ; $2^3 \cdot 5$	8
36, 54	$2^2 \cdot 3^2$; $2 \cdot 3^3$	
28, 44	$2^2 \cdot 7$; $2^2 \cdot 11$	
20, 88		
500, 1400		
840 ; 1500		

2) *Two-Ant Problem.*

In Monday's lecture, I showed how to solve the first part of the *Two-Ant Problem*, and then I gave a hint of how to solve the second part – unfold the box! If you haven't done so already, finish the second part of the Two-Ant Problem now. (See last week's assignment for details.)

For Thursday

3) *Nines Magic.*

In Monday's lecture, I showed you the following math trick:

Multiplying by Nines. Multiply the single digit by 9, which gives us a two-digit answer. Then separate these two digits and insert one less nine than what was in the original problem.

Example: For $8 \cdot 9999$, we multiply 8 times 9, which gives us 72. Then we insert three nines between the 7 and the 2, giving a final answer of 79,992.

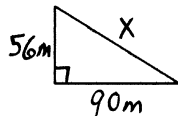
Your task: Find the trick for multiplying any 2-digit number times a number that has at least three digits, where all of the digits are 9's (e.g., $47 \times 99,999$). Then expand this trick to also work for any number with three or more digits, times a number with at least that many digits, where all of the digits are 9's (e.g., $8452 \times 999,999$, etc.).

4) *Chinese Remainder Theorem.* The ancient problem is stated as follows:

“If the soldiers in Han Xin's army parade in rows of 3 soldiers, 2 soldiers will be left. If they parade in rows of 5, 3 will be left, and in rows of 7, 2 will be left. How many soldiers are there in Han Xin's army?”

End-of-Year Review – Practice Sheet #1

- 1) Using this triangle...



- a) Find X by using Pythagorean triples.

- b) Calculate the area.

- 2) Use the square root algorithm to calculate $\sqrt{71}$ (rounded to three significant digits).
- 3) A triangle has three sides measuring 60cm, 70cm, and 90cm. Is it an acute, an obtuse, or a right triangle?

- 4) Calculate the volume of a sphere with a 10cm radius.

- 5) Calculate the volume and surface area of a box that measures 3" by 4" by 5".

- 6) a) How many mm^2 are in a cm^2 ?

- b) How many mm^3 are in a cm^3 ?

- 7) What is 13% of 350?

- 8) 60 is what percent of 75?

- 9) 75 is what percent of 60?

- 10) What percentage increase is it going from 360 up to 420?

- 11) 123 is 64% more than what?

- 12) What is 620 decreased by 9%?

- 13) Fred put \$6000 into a savings account that earns 2% APR. What will the balance of the account be after 30 years?

- 14) If a town doubles its population in 35 years, then what, approximately, is the average annual growth rate?

- 15) Joe is 85% as tall as Rick.

- a) How tall is Joe if Rick is 153cm tall?

- b) How tall is Rick if Joe is 153cm tall?

16) Unit Conversions

- a) $5\frac{1}{2} \text{ lb} \approx$ _____ kg

- b) $87 \text{ cm} \approx$ _____ in

- c) $6 \text{ cups} \approx$ _____ mL

- d) $3.9 \text{ km} \approx$ _____ yd

- e) $7 \text{ ft}^3 \approx$ _____ L

- f) $26 \frac{\text{m}}{\text{s}} =$ _____ $\frac{\text{km}}{\text{h}}$

- g) $1.8 \frac{\text{g}}{\text{cm}^3} \approx$ _____ $\frac{\text{lb}}{\text{ft}^3}$

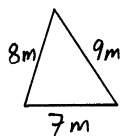
- 17) A cylindrical pool has a 4-foot diameter and is 18 inches deep. What is the weight of the water in the pool?

- 18) A machine can pump 300L of water in 35 minutes. How much can it pump in 3 hours?

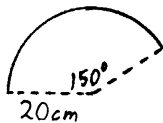
- 19) Patricia bikes up a 6-mile hill averaging 4 mph, and then bikes down the same hill at 30mph. What was her average speed for the whole trip?

End-of-Year Review – Practice Sheet #2

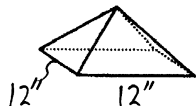
- 1) Calculate the area.



- 2) Calculate the length of the arc and the circle sector.



- 3) Calculate the volume of this pyramid given that its height is 8 inches.



- 4) Use the square root algorithm to calculate $\sqrt{42}$ (rounded to three significant digits).

- 5) What is 145% of 460?

- 6) What is 460 increased by 45%?

- 7) 950 is what percent of 7600?

- 8) 98 is 56% of what?

- 9) 330 is 12% less than what?

- 10) What percentage decrease is it going from 1500 down to 1200?

- 11) The population of a town is about 10,000, and is increasing by 3.5% per year. What will its population be in 100 years, if that growth rate continues?

- 12) Kevin bought a house for \$150,000 and then sold it for \$200,000 five years later. What was the percentage profit?

- 13) Leslie bought a house for \$200,000 and then sold it for \$150,000 five years later. What was the percentage loss?

- 14) Ted is 60% taller than Fred.

- a) How tall is Fred if Ted is 140cm tall?

- b) How tall is Ted if Fred is 140cm tall?

- 15) Dan's investment account earns 8% APR. About how long does it take for his money to double?

- 16) What is the density (in g/cm^3) of a cube that weighs 5kg and has edges that are 12cm long?

- 17) What is the weight (in kg) of a solid cube of aluminum that has 20cm-long edges?

- 18) What is the volume (in cubic inches) of 18 pounds of iron?

- 19) A cylindrical tank has a height of 235cm, a diameter of 110cm. What is its volume...

- a) in cm^3 ?

- b) in m^3 ?

- c) in ft^3 ?

- d) in gallons?

- e) in liters?

- f) What is the weight of the water (in kg) when the tank is filled?

- 20) A map has a scale of 1:10 000. What is the real distance between two landmarks if they measure 4.2cm apart on the map?

- 21) If it takes 6.8 gallons of gas to drive 238 miles, how far can you drive on 16 gallons?