

7th Grade Assignment – Week #18

Individual Work

- Do as much as you can with the problems on **Percents Sheet #3**.
- *Flashcards!* Keep practicing the “Percents to Fraction Conversion Flashcards”.
- *Oral Presentations.* Either next week, or in the final week, I would like each of you to give a 10-minute oral presentation to your tutorial group. You will need to research one of the following topics, and then give your presentation to the group. Here are some possible topics:
 - The biography of a famous mathematician (Gauss, al-Khwarizmi, etc.)
 - The historical importance of the Arabic mathematicians
 - A brief historical summary of an ancient culture’s mathematics (Babylonian, Indian, Egyptian, etc.)
 - Galileo’s law of falling bodies
 - The history of algebraic notation
 - The calendar of a particular ancient culture (Mayan, Chinese, Hindu, Classical Greece, Persian, Egyptian, etc.)
 - An ancient culture’s number system (Mayan, Babylonian, etc.).
 - Kepler’s laws of planetary motion
 - Another topic of your choosing

Please discuss which topic you would like with the others in your tutorial group in order to ensure that no two people choose the same topic.

Here are some guidelines for your presentation:

- A large part of the purpose of these presentations is to give you practice speaking before a group of people. You should learn about a topic, and then informally speak about what you have learned. Obviously, your camera needs to be on.
 - It may be best to share your thoughts without any visual aids. If you are going to share any images (pictures, diagrams, etc.), they should be your own creation. Please, no recorded videos, nor fancy PowerPoint presentations.
 - You may wish to make notes to help you to remember what to say in your presentation. But try to avoid just reading from your notes, or from words that are on the screen.
- *Main Lesson Book Work.*
 - Write an essay titled “Algebra as the Language of Mathematics”. In this essay, you should elaborate on the following points (of course, in your own words):
 - No matter where you are in the world, algebra is the common language in which to express mathematical thinking.
 - The ancient Greeks were brilliant thinkers, philosophers and mathematicians. But their mathematics was limited because they didn’t have a mathematical language to concisely and clearly express their thoughts.
 - Give an example of how a formula (perhaps the car rental formula, or the formula that converts Celsius into Fahrenheit) is a written set of instructions, written in the language of algebra, for performing a calculation.
 - (After watching lecture #2) Write an essay on “Carl Friedrich Gauss”. In this essay, you should elaborate on the following points (of course, in your own words):
 - The story of Gauss in school and the problem he was given.
 - How he solved the problem.
 - Give the formula for adding up the numbers from 1 to N. State what the formula actually means
 - Use the formula in order to add the numbers from 1 to some number (you choose!).
 - If you wish, you can read more about Gauss’s life and accomplishments and include (in your own words) some of this.

Group Assignments:

For Tuesday:

- 1) Determine a quick way to add up all the numbers starting at 1 and going up to 100.
- (If you still have time) Do the following temperature conversion problems:

$$C = \frac{5}{9} \cdot (F - 32)$$

$$F = \frac{9}{5} \cdot C + 32$$

- 2) What is 59°F in Celsius?
- 3) What is 40°C in Fahrenheit?
- 4) What is 82°F in Celsius?
- 5) What is 17°C in Fahrenheit?

For Thursday:

- *Galileo's Law.* Galileo discovered a method for determining how far an object falls (without regards to air resistance) after a certain number of seconds. We shall assume here that the distance is given in feet. The instructions for doing the calculation are:

To calculate the distance, square the time, and then multiply the result by 16.

- 1) **Rewrite these instructions as an algebraic formula.**

This is called Galileo's *Law of Falling Bodies*.

Use the above formula to answer the following questions:

- 2) (After being dropped from the top of a cliff), how far does an object fall in 3 seconds?
 - 3) How far does an object fall in 20 seconds? Why is your answer not realistic?
- *Working with Signed Numbers (Negative and Positive).*

Tell the "bank account story" for each problem. The answer to the problem is the ending balance. There is no need to write it all down; you can just say your answer to one another orally.

Example: $-5 + 12 - 20$

Solution: On the first day I withdrew \$5. On the second day I deposited \$12. On the third day I withdrew \$20. The ending balance in my account was negative \$13.

- | | |
|--------------|------------------------------|
| 6) $8 - 13$ | 10) $-15 + 18$ |
| 7) $13 - 8$ | 11) $7 + 4$ |
| 8) $-8 + 13$ | 12) $-20 - 13 + 50$ |
| 9) $-8 - 13$ | 13) $-12 + 16 - 40 - 60 + 4$ |

For Tuesday or Thursday: (If you have extra time)

- *Puzzle!*
 - 14) **Building Chairs.** If 3 boys can build 3 chairs in 3 days, how long (at that same rate) does it take 12 boys to build 12 chairs?
- *Puzzle!*
 - 15) Find three numbers that add to 18 and multiply to 7. (This is very challenging, but possible!)

Percents – Sheet #3

1) Convert to a percent.
(Hint: Try multiplying the numerator and denominator.)

- a) $\frac{9}{50}$
- b) $\frac{11}{20}$
- c) $\frac{8}{25}$
- d) $\frac{41}{50}$
- e) $\frac{87}{100}$
- f) $\frac{1}{4}$
- g) $\frac{5}{8}$

2) Convert to a percent.

- a) 0.61
- b) 0.0469
- c) 0.003

3) Think fractions!

- a) 12 is what percent of 48?
- b) 12 is what percent of 24?
- c) 12 is what percent of 25?
- d) 12 is what percent of 55?

4) Convert to a fraction.

- a) 60%
- b) 2%
- c) 8%
- d) 28%
- e) $66\frac{2}{3}\%$
- f) 30%
- g) $83\frac{1}{3}\%$
- h) 0.5%

5) What is ...

- a) 45 increased by 20%?
- b) 45 decreased by 20%?
- c) 45 increased by 80%?
- d) 45 decreased by 80%?

6) First, look through the problems, and then circle those that are easy. Do those in your head. Show your work for the others.

What is...

- a) 25% of 12?
- b) 10% of 800?
- c) 1% of 6170?
- d) 40% of 55?
- e) 25% of 3600?
- f) 10% of 37?
- g) 87.5% of 240?
- h) 13% of 49.6?
- i) 0.8% of 3500?

7) Finding the base.

a) 8 is 50% of what number?

b) 12 is 25% of what number?

c) 13 is 10% of what number?

d) 9 is 1% of what number?

8) Price after tax. How much do you have to pay for a bike marked at \$250 if there is a 7% tax rate?

9) Discount.

A bike normally listed for \$300 is on sale for a 20% discount. What is the new discounted price?

10) Quickly Estimate.

a) What is 48% of 8280?

b) What is 26% of 17.3?

c) 63 is what percent of 92?

d) 3419 is what percent of 7146?

e) \$58 is what percent of \$62?

Mental Math

11) $53^2 =$

12) $57^2 =$

13) $11000 \div 25 =$

14) $247.5 \div 100 =$

15) $82 \cdot 88 =$

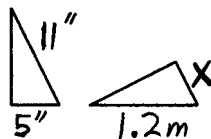
16) $360 \div 45 =$

17) $350 \cdot 120 =$

18) $15 \cdot 320 =$

Review

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



20) Everyone in Jeff's class is either from Guatemala or Bolivia. The ratio of Bolivians to Guatemalans is 3:4.

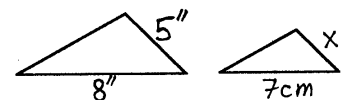
a) If there are 16 Guatemalans, then how many Bolivians are there?

b) What proportion of the class is Bolivian?

c) What proportion of the class is Guatemalan?

d) If there are 35 students in the class, then how many are Bolivian and how many are Guatemalan?

21) Find X given that the two triangles are similar.



22) An amount of money is to be divided between Mary and John in a ratio of 5:3. How much does John get if Mary gets \$330?