8th Grade Assignment – Week #21

<u>Announcement</u>:

- The **Percent & Growth Test** will be included in next week's assignment.

<u>Individual Work</u>

- Your major task this week is to prepare for the test on the *Percents & Growth* unit. Here are suggestions for how to do this:
    - Finish Percents & Growth **Practice Sheet #6**. (Part of it was assigned last week.)
    - Do the practice test found at the end of this document.

<u>Group Assignments</u>:

For Tuesday:

- Help each other out with the more difficult problems from the individual work, above.

For Thursday: **Puzzles!**

1) Jackson and Franny have 7 pets between the two of them. Steve has twice as many pets as Jackson. Steve has 5 more pets than Franny. How many pets do the three children have all together?

2) With the configuration on the right, each letter stands for a different (single) digit. Assign values to the letters so that the products $A \cdot B \cdot C$, $B \cdot D \cdot E$ and $F \cdot E \cdot G$ are all equal.

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A       F
B   D   E
C       G
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Percents & Growth – Practice Sheet #6

Note: You may use a calculator for this sheet, but write down what goes into your calculator.

Mixed problems.

1) What is 230 increased by 2.8%?

2) 53 is what percent of 66?

3) What percentage increase is it going from 17 up to 41?

4) 76.26 is 23% more than what?

5) 162 is 3.6% of what?

6) What percentage decrease is it going from 395 down to 158?

7) What is 8200 decreased by 93%?

8) 69 is 11% less than what?

9) What is 265% of 4300?

10) What is 4300 increased by 165%?

11) 8 is what percent of 53?

12) 8 is what percent of 530?

13) What percentage increase is it going from 536 up to 737?

14) 6794 is 79% of what?

15) 61.56 is 62% more than what?

16) What percentage decrease is it going from 320 down to 307.2?

17) What is 400 increased by 25%, and then decreased by 25%?

Use the *Rule of 72* to quickly answer each.

18) David's savings account earns 2.4% APR. How long does it take for his money to double?

19) Pam's house doubled in value over an 18-year period. What was the average annual rate at which the value was increasing during that period?

Word Problems.

20) Joan was billed $572.94 for a pair of skis. What was the marked price if the tax rate was 6.1%?

21) Jen is 185cm tall and her son, JR, is 74cm tall.
   a) JR is what percent of Jen's height?

   b) Jen is what percent of JR's height?

   c) JR is what percent shorter than Jen?

   d) Jen is what percent taller than JR?

22) Bob weighs 20% more than Pete. If Pete weighs 180 lb…
   a) How much does Bob weigh?

   b) Pete weighs what percent less than Bob?

23) Mike weighs 20% less than TJ. If Mike weighs 180 lb...
   a) How much does TJ weigh?

   b) TJ weighs what percent more than Mike?

24) John has 35% as much money as Dave. How much does Dave have if John has $252?

25) In the year 2000, Japan had a population of 127 million with a 0.23% growth rate, and Nigeria had a population of 123 million with a 2.6% growth rate. Assuming that those growth rates continue…
a) What will Japan's population be in 2010?

b) What will Japan's population be in 2080?

c) What will Nigeria's population be in 2010?

d) What will Nigeria's population be in 2080?

e) What can be said about the last answer?

26) *Challenge!* Depreciation is when the value of something drops. (e.g., The depreciation of a car is typically 30% in the first year.)
   Sally bought a used car for $12,000 and it depreciated at a rate of 15% annually. How much was it worth after eight years?

Percents Unit Practice Test #1

1. What is 87.5% of 240?

2. What is 61% of 450?

3. What is 2300 increased by 30%?

4. What is 70 decreased by 20%?

5. 60 is what percent of 180?

6. 1364 is what percent of 3702?

7. 210 is what percent of 280?

8. 210 is what percent less than 280?

9. 280 is what percent more than 210?

10. 6000 is 25% of what number?

11. 560 is 35% of what number?

12. 247 is 30% greater than what number?

13. 648 is 40% less than what number?

14. 430 is what percent greater than 180?

15. How long will it take Lizzy's money to double if her investment grows at 8% per year?

16. How long will it take Lizzy's money to quadruple if her investment grows at 8% per year?

17. Dan and Juan ran in a 10-K race. Dan took 15% more time to complete the race than Juan took.
    a) What was Juan's time if Dan's time was 44 minutes?

    b) What was Dan's time if Juan's time was 44 minutes?

18. What is the balance in a savings account after 20 years at 5% interest if the initial deposit was $300?

19. If a certain animal has a birth weight of 15 pounds, how much will it weigh after 2 years if it gains 13% weight per month?

Solutions for Practice Test

1. What is 87.5% of 240?
   $240 \cdot 0.875 = \underline{210}$
   or $240 \cdot \frac{7}{8} = \underline{210}$

2. What is 61% of 450?
   $0.61 \cdot 450 = \underline{274.5}$

3. What is 2300 increased by 30%?
   $2300 \cdot 0.3 = 690 \rightarrow 2300 + 690 = \underline{2990}$
   or $2300 \cdot 1.3 \rightarrow \underline{2990}$

4. What is 70 decreased by 20%?
   $70 \cdot 0.2 = 14 \rightarrow 70 - 14 = \underline{56}$
   or $70 \cdot 0.8 \rightarrow \underline{56}$

5. 60 is what percent of 180?
   $\frac{60}{180} = \frac{1}{3} \rightarrow \underline{33\frac{1}{3}\%}$

6. 1364 is what percent of 3702?
   $\frac{1364}{3702} = 0.368 \rightarrow \underline{36.8\%}$

7. 210 is what percent of 280?
   $\frac{210}{280} = \frac{3}{4} \rightarrow \underline{75\%}$

8. 210 is what percent less than 280?
   Looking at the above problem, since 210 is 75% of 280, then we know 210 is $\underline{25\% \text{ less than}}$ 280.
   or % decrease $= \frac{\text{amount of decrease}}{\text{start}}$
   $= \frac{70}{280} \rightarrow \underline{25\%}$

9. 280 is what percent more than 210?
   % increase $= \frac{\text{amount of increase}}{\text{start}}$
   $= \frac{70}{210} \rightarrow \frac{1}{3} \rightarrow \underline{33\frac{1}{3}\%}$
   or we ask instead "280 is what % of 210?"
   $280 \div 210 = 1.3 \rightarrow 133\frac{1}{3}\%$, which is a $\underline{33\frac{1}{3}\%}$ increase.

10. 6000 is 25% of what number?
    Reverse problem! We need to divide.
    $6000 \div 0.25 \rightarrow \underline{24,000}$
    or $6000 \div \frac{1}{4} \rightarrow 6000 \cdot 4 \rightarrow \underline{24,000}$

11. 560 is 35% of what number?
    Reverse problem! We need to divide.
    $560 \div 0.35 \rightarrow \underline{1600}$

12. 247 is 30% greater than what number?
    Reverse problem! We need to divide. And it's an increase/decrease problem, so we need to reword it to: "247 is 130% of what number?" $247 \div 1.3 \rightarrow \underline{190}$

13. 648 is 40% less than what number?
    Reverse problem! We need to divide. And it's an increase/decrease problem, so we need to reword it to: "648 is 60% of what number?" $648 \div 0.6 \rightarrow \underline{1080}$

14. $430 \div 180 = 2.3\overline{8}$, which means that 430 is about 238.9% of 180, and is therfore $\underline{138.9\% \text{ greater than}}$ 180.

15. Because this doubling, we can use the Rule of 70-72. $72 \div 8 \approx 9$ years.

16. We can use the table. Under the 1.08 column, we see that it takes about 18 years. We also could have concluded that quadrupling is doubling twice.

17. a) We ask: "44 is 15% more than what?" and then: "44 is 115% of what?"
    $44 \div 1.15 \approx 38.26 \approx 38$min, 16sec
    b) We ask: "What is 15% more than 44?" and then: "What is 115% of 44?"
    $44 \cdot 1.15 = 50.6 = 50$min, 36sec

18. What is the balance in a savings account after 20 years at 5% interest if the initial deposit was $300?
    We can look up 1.05^{20} in the growth table, and see that the value is 2.6533, and then multiply this by 300 to get $\underline{\$795.99}$.
    or we can use the formula $P = P_0 (1+r)^t$ which gives $300 \cdot 1.05^{20} = \underline{\$795.99}$.

19. If a certain animal has a birth weight of 15 pounds, how much will it weigh after 2 years if it gains 13% weight per month? There is no 13% column in the growth table, so we must use the formula. Note it is in months. $15 \cdot 1.13^{24} \approx \underline{281.8 \text{ pounds}}$.