

6th Grade Assignment – Week #28

Individual Work:

- Do as much as you can with Sheet #24 in the workbook.

Group Assignments:

For Tuesday **Rules for Repeating Decimals**

- **Background:** This is the prime factorization of a string of 9's
 $9 = 3^2$ $999999 = 3^3 \times 7 \times 11 \times 13 \times 37$
 $99 = 3^2 \times 11$ $9999999 = 3^2 \times 239 \times 4649$
 $999 = 3^3 \times 37$ $99999999 = 3^2 \times 11 \times 73 \times 101 \times 137$
 $9999 = 3^2 \times 11 \times 101$ $999999999 = 3^4 \times 37 \times 333667$
 $99999 = 3^2 \times 41 \times 271$ $9999999999 = 3^2 \times 11 \times 41 \times 271 \times 9091$
- **Remember:** $3^2 = 9$; $3^3 = 27$; $3^4 = 81$
- Look for patterns with the above factorizations. What do you notice?
- **Note to parent/teacher/tutor:** The below problems may take some guidance. You may need to help them out a bit. Look at the above prime factorizations.
For each of the below fractions, state how many number digits will end up under the repeat bar if you convert it to a repeating decimal. (You don't need to actually convert to a decimal.)

1) $\frac{8}{11}$	3) $\frac{31}{41}$	5) $\frac{8}{13}$	7) $\frac{31}{333667}$	9) $\frac{31}{73}$
2) $\frac{59}{101}$	4) $\frac{31}{271}$	6) $\frac{31}{137}$	8) $\frac{31}{4649}$	

- Convert each of the below fractions to a repeating decimal. (Don't do any long division!!!)

Example #1: $\frac{23}{27}$

Solution: I notice that the denominator is 27, which is also 3^3 . This is part of the prime factorization for 999, which tells me that 27×37 is 999. Therefore, I multiply the top and bottom of the original fraction by 37. This nicely gives me 999 in the denominator, and 851 (37×23) in the numerator. Now I can say that $\frac{23}{27} = 0.851$

Example #2: $\frac{38}{41}$

Solution:

We see that 41 appears in the prime factorization of 99,999. So immediately we know that $\frac{38}{41}$ must repeat every 5 digits. Our job now is to convert the fraction so that it has 99,999 in the denominator. Since the prime factorization of 99,999 is $3^2 \times 41 \times 271$, I know to multiply both the numerator and the denominator (41) by 9 and by 271. When I do so, the fraction $\frac{38}{41}$ becomes $\frac{92682}{99999}$, which easily can be converted into the decimal 0.92682 .

Now do these problems:

10) $\frac{4}{11}$	11) $\frac{14}{27}$	12) $\frac{53}{101}$	13) $\frac{150}{271}$
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- *Extra Challenge problems!* Again, state how many number digits will end up under the repeat bar if you convert it to a repeating decimal. Hints: You don't need to actually convert it to a repeating decimal. It is helpful to first find the prime factorization of the denominator. You can ignore the parts of the prime factorization that has 2's and 5's.

$$14) \frac{31}{111}$$

$$16) \frac{137}{250}$$

$$18) \frac{137}{650}$$

$$15) \frac{31}{77}$$

$$17) \frac{137}{275}$$

$$19) \frac{137}{675}$$

For Thursday Choose what you want to work on!

Baseball Puzzle!

Here are some facts that you may not know about Major League Baseball (MLB):

- There are 30 teams.
 - Each team plays 162 games in a season.
 - In every game, about 50 baseballs are used.
 - A baseball weighs about 5 ounces.
- 1) How many MLB games are played every season?
 - 2) Approximately how many baseballs in total are used in MLB games every season? (Round your answer to two significant digits.)
 - 3) If all of those baseballs were gathered together, what would the total weight be? (Give your answer rounded to the nearest ton.)

Dartboard Puzzle!

- 4) John's dartboard has scores of 16, 17, 23, 24.
How can someone get a score of exactly 100?

Repeating Decimals (Only for those groups who want an extra challenge!)

- You will still need to refer to the prime factorizations for 9's found in Tuesday's group assignment.
- For each of the below fractions, first state how many digits must appear under the repeat bar, then convert it to a repeating decimal by multiplying top and bottom by the appropriate number (without doing any long division!).

Don't forget these facts: $3^2 = 9$; $3^3 = 27$; $3^4 = 81$

$$5) \frac{2}{9}$$

$$6) \frac{6}{11}$$

$$7) \frac{61}{101}$$

$$8) \frac{349}{909}$$

$$9) \frac{3}{20}$$

$$10) \frac{83}{271}$$

$$11) \frac{2743}{4649}$$

6th Grade Math – Sheet #24

Do it in your head.

- 1) $14 \cdot 3$
- 2) 15^2
- 3) $25 \cdot 5$
- 4) 2^3
- 5) 4^4
- 6) 2^{10}
- 7) $72000 \div 60$
- 8) $1030 \cdot 1050$
- 9) $736 - 677$
- 10) $35 \cdot 999$
- 11) $216 \cdot 5$
- 12) $216 \div 5$
- 13) $\sqrt{3600}$
- 14) $\left(\frac{3}{25}\right)^2$
- 15) Convert to a percent.
 - a) $\frac{3}{4}$
 - b) $\frac{3}{8}$
 - c) 0.7
- 16) Convert to a fraction.
 - a) 80%
 - b) 17%
 - c) 0.002
 - d) 0.52
- 17) Convert to a decimal.
 - a) $\frac{6}{11}$
 - b) 62%

Fractions, Decimals & Percents.

- 18) $0.045 - 0.00032$
- 19) $0.045 \cdot 0.00032$
- 20) $0.045 \div 0.00032$
- 21) $0.00005 \div 0.004$
- 22) $\frac{67}{90} - \frac{14}{40}$
- 23) $\frac{24}{36} \cdot \frac{25}{35}$
- 24) $5 \div 3\frac{4}{5}$
- 25) What is 83% of 250?
- 26) What is $37\frac{1}{2}\%$ of 8?
- 27) 14 is what percent of 42?
- 28) 13 is what percent of 90?
- 29) $\frac{3}{4}$ is what percent of $4\frac{1}{2}$?
- 30) Jim's meal at the Yummy Plate restaurant cost \$23.00. What was his total cost if he left a 15% tip and had to pay 7% tax?
- 31) Mary bought a house for \$160,000 and sold it 10 years later at a 75% profit. How much did she sell the house for?

32) John bought a new car for \$31,500 and then sold it a year later at a 30% loss. How much did he sell the car for and how much money did he lose?

Ratios.

33) There are 275 students and 25 teachers at Southern Middle School. What is the student to teacher ratio?

34) A recipe calls for 2 quarts of water, 3 eggs, 5 cups of flour, and 2 teaspoons of salt. What is the ratio of flour to water?

Rates.

35) A plane is traveling at 610 mph.

a) How far does the plane go in 3 hours?

b) How far does the plane go in $5\frac{1}{2}$ hours?

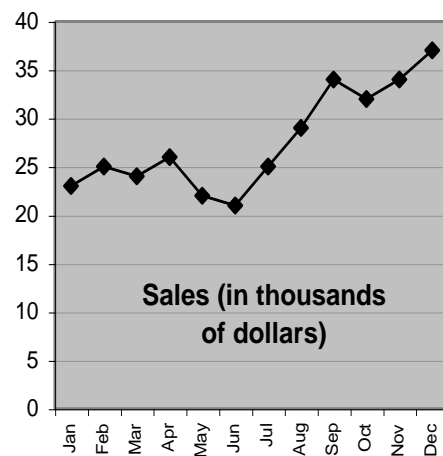
c) How long does it take the plane to go 3000 miles? (Round your answer to the nearest minute.)

36) What is Betty's average speed if...

a) She bikes 36 miles in 3 hours?

b) She bikes 36 miles in 3 hours 15 minutes? (Round your answer to three significant digits.)

Line Graphs.



The above graph shows the amount of sales at Kate's Bike Shop during last year.

37) Which month had the least amount of sales, and what was the amount of sales in that month?

38) Which month had the greatest amount of sales, and what was the amount of sales in that month?

39) Which period of time had the greatest growth in sales?

40) Which period of time had the greatest drop in sales?

41) For which period of time was sales relatively constant?