**Lesson 25 Notes: Ratios, Rates, Proportions and Percents**

**What is a Ratio?**

**Example of Ratio:**

**What is a Rate?**

**Example Rate:**

Since a ratio and rate are expressed as a fraction, it can often be reduced.

For example, 120 miles to 2 hours can be reduced to

**Example A:** If there are 5 women and 8 men in the math lab, answer the following.

1. What is the ratio of the number of women to men?
2. What is the ratio of the number of men to women?
3. What is the ratio of the number of men to the total?

\* How do we solve proportions in word problems?

**What is a Proportion?**

**Example of Proportion:**

**Setting up a Proportion:**

**Example B:** If the ratio of teachers to students in a school is 1 to 18 and there are 360 students, how many teachers are there?

**Example C:** The distance between two cities is 150 miles. The scaled distance between the cities on a map is drawn as 1 ½ inches. If the distance between two other cities is 900 miles, what is the scaled distance between them on the map?

**Example D:** A chef knows that he can serve 8 people with 3 pounds of fish. How many pounds of fish does he need to serve 50 people?

**Example E:** If 4.8 pounds of flour costs $1.20, how much will 6 pounds cost?

**What is a Percent?**

**Practice Converting Fractions to Decimals to Percents:**

Changing fractions to decimals to percent and vice versa: Fill in the missing values in the table.

|  |  |  |
| --- | --- | --- |
| FRACTION | Decimal | Percent |
|  |  | 42% |
|  | .07 |  |
| 1/5 |  |  |
|  |  | 6.8% |
|  | .647 |  |
| 1/8 |  |  |
|  |  | 21 ¾ % |
|  | 3.25 |  |
| 1/3 |  |  |
|  | 1 | 100% |
|  |  |  |
| 3 1/8 |  |  |
|  | .035 |  |

**WORD PROBLEMS with Percents**

**Example F:** 120 is what percentage of 80?

**Example G:** What is 65% of 90?

**Example H:** 20 is 30% of what number?

**Example I:** A survey of football players revealed that 20 percent of 1180 players had knee injuries. How many players had knee injuries?

**Example J:** Natalee correctly answered 123 questions out of 150 questions on an exam. What percent of the questions did she answer correctly?

**Example K:** This semester, Brayden spent $250 on books. If this amount represents 5% of his student loan, how much is the amount of the loan?

**Example L:** If $880 of a $2000 loan has been paid off, what percentage is this?

**Example M:** The school population for the new year in a certain town is 135 percent of the school population for the previous year. If the new population is 378, how many students did the school have for the previous year?

**Example N:** What is the cost of a pair of shoes that is listed for $36.40 with a 15% discount?

**Example O:** What is the cost of an item that costs $30.94 with 6% sales tax?

**Mental Calculations with PERCENTS**

Calculate mentally!!

**Example P:** 15 percent of 82

**Example Q:** 20 percent of $31.40

**Example R:** 25 percent of $30

**Example S:** 25 percent of 88

**Example T:** 20 percent of 55

**Example U:** 75 percent of 24