Proportional Relationships: Percents

A ***ratio*** is the comparison of two quantities by division.

Consider this example:

Suppose that 24 students and 6 teachers go on a field trip. You can compare the number of students to the number of teachers by dividing. Since 24 ÷ 6 = 4, you can say that there are 4 times as many students as teachers. You can also say there are 4 students for every teacher. A way of saying this using the term *ratio* is to say: The ratio of students to teachers is 4 to 1.

A ratio where the units being compared are different is sometimes called a ***rate*** or a ***unit rate***.

Here are some examples of rates:

- Miles per hour (a rate of speed)
- People per square mile (a measure of population density)
- Dollars per hour (a rate of pay)

As in all ratios, calculating a rate involves comparing two quantities by division. For example, if you travel 20 miles in 4 hours, you can compare these two quantities by dividing the distance by the time:

20 mi4 hr=5 mi1 hr = 5 miles per hour or 5 mi/hr or 5 mph

The rate 5 mph is a rate of ***speed***.

Percents and Ratios

To illustrate the link between percents and ratios, return to the example where 6 teachers and 24 students went on a field trip. You know that 30 people went on the field trip. You can compute the ratio of teachers to the

total number of people.

6 ÷ 30 = 0.2

A number such as 0.2 can always be expressed as a ratio of some number to 100.

In this case, 0.2 = 0.2=20100 and the ratio is 20 to 100.

A ratio of something to the special denominator 100 is called a ***percent* (%)**. So you can say that 20% of the people on the field trip are teachers. This means:

teacherspeople on the field trip=630=20100

These two statements are equivalent:

- The ratio of teachers to all people on the field trip is 20 to 100.
- Teachers represent 20% of the people on the field trip.