Introduction

We will be using proportions throughout this course. Proportions are used to describe probabilities and express quantities in relation to the whole. This section helps your practice some of the techniques we use when working with percentages and proportions as well as the need for rounding.

"Percent" means *"per one hundred",* which means dividing by 100. Dividing by 100 moves the decimal point two places to the LEFT.

Example 1: Convert 5% to a decimal.

Locate the decimal for the percentage and then divide by 100, which moves the decimal point two places to the left.

$$5.3\% = 5.3 \div 100 = 0.053$$

Example 2: Convert $\frac{1}{4}$ to a decimal.

First, we remember that the fraction bar indicates division, $\frac{1}{4} = 1 \div 4$. Then all we need to do is divide.

$$\frac{1}{4} = 0.25$$

If you are given a word problem comparing part of a group to the entire group, you can create a proportion.

Example 3: A survey of 450 statistics students showed that 279 of these students needed statistics as their last math course in their educational plan. Create a proportion to describe this.

We can take the 279 students who needed statistics as their last math class and divide them by the whole group of 450 surveyed.

$$\frac{\text{part of group}}{\text{whole group}} = \frac{279}{450} = 279 \div 450 = 0.62$$

Since we know proportions compare part of a group to the whole group, we know that all proportions should be between 0 and 1.

*Classwork***:** Write the given information in each example as a proportion. Final asnwer should be written as a decimal.

Exercise	*Proportion*
1) Janine sampled 40 different 6-inch sandwiches from Subway. Only 6 of the sandwiches had a total calorie count under 600 calories for a 6-inch serving.	
2) Liam took a survey and 72% of the people surveyed agreed that the textbooks offered were too expensive.	
3) Emily rolled a fair six-sided die. She discovered that the probability of her obtaining a number greater than 4 was 2 out of 6.	
4) George owns a car dealership and found that 0.4% of his customers purchase the base model of their vehicles.	
5) A professor found that $\frac{15}{80}$ of her students left the last question on the test blank.	

Rounding

First, identify the number that is in the place that you are being asked to round to. If the number to the right of that number is under 5, then you leave the number as is. If the number to the right is 5 or more then you round the digit up by one number. All numbers to the right of the number you are rounding to become zero.

Example 4: Round 0.45129 to three decimal places.

If you look at the number in the third decimal place 0.45129, we see that "2" is the value to the right of "1". "2" is a value below 5 so we would leave the "1" as is, and remove the rest of the values to the right.

$$0.45\mathbf{1}29 \approx 0.45\mathbf{1}$$

Example 5: Round 1.2598 to three decimal places.

If you look at the number in the third decimal place 1.2598 we see that "8" is the value to the right of "9". "8" is a value that is 5 or more so change the "9" to the next number up. Since the next number up is "10" we round the digit "9" to a "0" and add 1 to the second decimal place, which is the "5". We also remove the values to the right of the "9".

$$1.259\mathbf{8} \approx 1.26\mathbf{0}$$

Example 6: Round -1.99996 to two decimal places.

If you look at the second decimal place -1.99996 we see that "9" is the value to the right of "9". "9" is a value that is 5 or more so change the "9" to the next number up. Since the next number up is "10" we change the digit "9" to a "0" and add 1 to the first decimal place, which is also a "9". So this value also becomes a "0", and a "1" is added to the next value, which is a "1". The number continues to be negative.

$$-1.99996 \approx -2.00$$

First, determine whether the underlined numerical value is a parameter or statistic. Then rewrite it as a decimal rounded to three decimal places.

Exercise	*Proportion*
6) A survey of 886 college students showed that 54.13% voted in the past election.	• Parameter or Statistic? • proportion _____
7) In a major-league soccer club there are 24 teams. Of the 24 teams, 14 of them received new sponsors.	• Parameter or Statistic? • proportion _____
8) A local zoo found that 13.265% of their zoo animals are nocturnal.	• Parameter or Statistic? • proportion _____
9) 51 of the 91 PCC students interviewed claimed that they had anxiety of public speaking.	• Parameter or Statistic? • proportion _____
10) Alex wants to choose five cards from a standard deck of 52 cards. The probability that he obtains two diamond cards, without replacement, is 1/17.	• Parameter or Statistic? • proportion _____
11) In a survey of Californians, 13,996 out of the 20,000 students surveyed said they check their cell phones at least five times every hour.	• Parameter or Statistic? • proportion _____