2-10 Reteaching

Change Expressed as a Percent

A percent change occurs when the original amount changes and the change is expressed as a percent of the original amount. There are two possibilities for percent change: percent increase or perent decrease. The following formula can be used to find percents of increase/decrease.

$$\text{percent change} = \frac{\text{amount of increase or decrease}}{\text{original amount}}$$

Problem

In its first year, membership of the community involvement club was 32 members. The second and third years there were 28 members and 35 members respectively. Determine the percent change in membership each year.

From the first to the second year, the membership went down from 32 to 28 members, representing a percent decrease. The amount of decrease can be found by subtracting the new amount from the original amount.

$$\text{percent change} = \frac{\text{original amount - new amount}}{\text{original amount}}$$

Percent Change Formula for percent decrease.

$$= \frac{32-28}{32}$$

Substitute 32 for the original number and 28 for the new number.

$$= \frac{4}{32} = 0.125$$

Subtract. Then divide.

Membership decreased by 12.5% from the first year to the second year.

From the second to the third year, the membership increased from 28 to 35 members, representing a percent increase. The amount of increase can be found by subtracting the original amount from the new amount.

$$\text{percent change} = \frac{\text{original amount - new amount}}{\text{original amount}}$$

Percent Change Formula for percent increase.

$$= \frac{32-28}{32}$$

Substitute 28 for the original number and 35 for the new number.

$$= \frac{7}{32} \approx 0.22$$

Subtract. Then divide.

Membership increased by about 22% from the second year to the third year.

Exercises

Tell whether each percent change is an increase or decrease. Then find the percent change. Round to the nearest percent.

1. Original amount: 25
New amount: 45

2. Original amount: 17
New amount: 10

3. Original amount: 22
New amount: 21

Errors can occur when making measurements or estimations. Percents can be used to compare estimated or measured values to exact values. This is called relative error. Relative error can be determined with the following formula comparing the estimated value and the actual value.

$$\text{percent error} = \frac{\left|\text{measured or estimated value - actual value}\right|}{\text{actual value}}$$

Problem

Mrs. Desoto estimated that her class would earn an average of $126 per person for the fundraiser. When the money was counted after the fundraiser ended, each student had raised an average of $138 per person. What is the percent error?

There are two values given in this situation. The estimated value is $126 per person. The actual value that each person raised was $138.

$$\text{percent error} = \frac{\left|\text{measured or estimated value - actual value}\right|}{\text{actual value}}$$ Percent Error Formula

$$= \frac{|126 - 138|}{138}$$ Substitute 126 for the estimated value and 138 for the actual value.

$$= \frac{|-12|}{138}$$ Subtract.

$$= \frac{12}{138}$$ | –12 | = 12

$$\approx 0.09$$ Divide.

There was a 9% error in her estimation.

Exercises

Find the percent error in each estimation. Round to the nearest percent.

4. You estimate that your baby sister weighs 22 lbs. She is actually 26 lbs.

5. You estimate that the bridge is 60 ft long. The bridge is actually 53 ft long.

6. You estimate the rope length to be 80 ft. The rope measures 72 ft long.

7. A carpenter estimates the roof to be 375 ft^2. The rectangular roof measures 18 feet wide by 22 feet long. What is the percent error?

Lesson 2-10

Find each percent of change. Describe each as a percent of increase or decrease. Round to the nearest percent.

1. $4.50 to $5.00

2. 56 in. to 65 in.

3. 18 oz to 12 oz

4. 1 s to 3 s

5. 8 lb to 5 lb

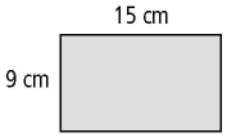
6. 6 km to 6.5 km

Find the percent of change. Describe the percent of change as an increase or decrease.

7. A $1500 computer is on sale for $1275.

8. The value of a stamp collection increases from $160 to $180 in one year.

9. The side lengths of the rectangle to the right have been measured to the nearest centimeter, as shown. What is the greatest possible percent error in finding the area of the rectangle?



Answers: 11.1% inc, 16.1% inc, 33.3% dec, 200% dec, 37.5% dec, 8.3% inc, 15% dec, 12.5% in, 42.9% too high.