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Change Expressed as a Percent

Unit 2 Lesson 10

CHANGE EXPRESSED AS A PERCENT

Students will be able to:

Show the change expressed in terms of percentage
and find percent error in measurements

Key Vocabulary:

- Percent Change
- Percent Increase, Percent Decrease
- Percent Error
- Minimum and Maximum Dimensions

CHANGE EXPRESSED AS A PERCENT

Percent Change

It is the ratio of the amount of change to the original amount expressed as a percentage.

Mathematically, it is represented as:



$$\text{Percent Change} = \frac{\text{New} - \text{Original}}{\text{Original}} \times 100\%$$

Percent Increase

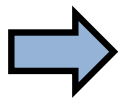
If the percentage change is positive, there is a percent increase.

Percent Decrease

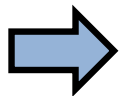
If the percentage change is negative, there is a percent decrease.

CHANGE EXPRESSED AS A PERCENT

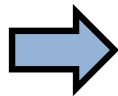
Problem 1: The price of a watch changed from 45\$ to 50\$ in one year. What is the percent change in the price of the watch? Also tell whether there is percent increase or decrease?



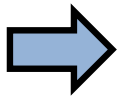
$$\text{Percent Change} = \frac{\text{New} - \text{Original}}{\text{Original}} \times 100\%$$



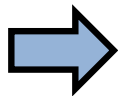
$$\text{Percent Change} = \frac{50\$ - 45\$}{45\$} \times 100$$



$$\text{Percent Change} = \frac{5}{45\$} \times 100$$



$$\text{Percent Change} = 11.1\% > 0$$



Percent Increase

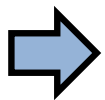


CHANGE EXPRESSED AS A PERCENT

Percent Error

It is the ratio of the **absolute** value of the difference between the estimated value and an actual/measured value compared to the actual value, represented as a percentage.

Mathematically, it is represented as:



$$\text{Percent Error} = \frac{|Measured - Actual|}{Actual} \times 100 \%$$

CHANGE EXPRESSED AS A PERCENT

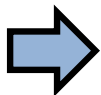
Problem 2: A decorator estimates that a rectangular rug is 5 ft. by 7 ft. The actual dimensions of the rug are 5 ft. by 8 ft. What is the percent error in the estimated area?



$$\text{Percent Error} = \frac{|Measured - Actual|}{Actual} \times 100 \%$$

$$\text{Measure Area} = 5 \times 8 = 40 \text{ sq.ft}$$

$$\text{Actual Area} = 5 \times 7 = 35 \text{ sq.ft}$$



$$\text{Percent Error} = \frac{|40 - 35|}{35} \times 100 \%$$



$$\text{Percent Error} = \frac{5}{35} \times 100 \%$$



$$\text{Percent Error} = 14.26 \%$$



CHANGE EXPRESSED AS A PERCENT

Maximum and Minimum Dimensions

If we are given the greatest possible error in the dimensions, we can find the maximum and minimum dimensions of any object using the greatest possible error.

Mathematically,



$$\text{Greatest Possible Error (GPE)} = \frac{1}{2} \times 1 \text{ unit of measurement}$$

If any measurement of the dimension is x , then the maximum and minimum is given as:



$$\text{Maximum Dimension} = x + GPE$$



$$\text{Minimum Dimension} = x - GPE$$



CHANGE EXPRESSED AS A PERCENT

Problem 3: A student's height is measured as 60 inches to the nearest inch.
What is the maximum and minimum height possible of the student?

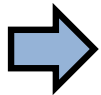


$$\text{Greatest Possible Error (GPE)} = \frac{1}{2} \times 1 \text{ inch} = 0.5 \text{ inch}$$

Let x be the height of the student,



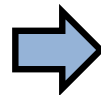
$$\text{Maximum Dimension} = x + GPE$$



$$\text{Maximum Dimension} = 60 + 0.5 = 60.5 \text{ inches}$$



$$\text{Minimum Dimension} = x - GPE$$



$$\text{Minimum Dimension} = 60 - 0.5 = 59.5 \text{ inches}$$

