Panel 1 (Oct 15-10:13 AM)

Activate Prior Knowledge

A <u>ratio</u> is a comparison of two or more <u>quantities with the same unit</u>. So, units are not required.

A <u>rate</u> is a comparison of quantities with different units (e.g. L/km, km/h, etc.).

A ratio can be written in different forms:

$\frac{2}{3}$ ← as a fraction

2 to 3 ← using words

2 : 3 ← colon notation

Ex 1: There are 1000 students enrolled in Mathville high school. The ratio of girls to boys is 3:2.

   a) How many boys and how many girls go to this school?

   b) The average class size is <u>28 students</u>. Suppose this class is representative of all the students in the school. How many students in the class are girls? How many are boys?

Ans: Let x represent the number of girls and let y represent the number of boys.

$$\begin{cases} x+y = 1000 \quad \cdots \text{①} \\ \frac{3}{2} = \frac{x}{y} \quad \cdots \text{②} \end{cases} \qquad \frac{3}{2} = \frac{girls}{boys}$$

- Solve the above linear system of equations by substitution or elimination.
- Solve ① for y, $y = 1000 - x \cdots$ ③
- Sub. $y = 1000 - x$ into ②

$$\frac{3}{2} = \frac{x}{1000-x} \quad \leftarrow \text{simplify and solve for } x$$

$$3(1000-x) = 2x$$
$$3000 - 3x = 2x$$
$$3000 = 2x + 3x$$
$$3000 = 5x$$
$$\frac{5x}{5} = \frac{3000}{5}$$
$$\boxed{x = 600}$$

- To find y, substitute $x = 600$ into ① or ② or ③.
$$y = 1000 - x$$
$$= 1000 - 600$$
$$= 400$$
∴ 600 girls and 400 boys go to this school

b) $\left(\frac{600}{1000}\right) \times 100\% = 60\%$ of the students are girls

$\left(\frac{400}{1000}\right) \times 100\% = 40\%$ of the students are boys

∴ 60% of 28 = 0.60 × 28 | ∴ 40% of 28 = 0.40 × 28
$= 16.8$ | $= 11.2$
$\doteq 17$ girls | $\doteq 11$ boys
| OR
| (28 - 17 = 11)

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Panel 2 (Oct 15-10:15 AM)

Measures of Central Tendency and Range

The three measures of central tendency are: mean, median and mode.

Mean is defined as the sum of the values of a variable divided by the number of values.

The median is the middle entry in an ordered list. There are as many data points above it as below it.

To find the median,

   a) If there is <u>an odd</u> number of data points, take the middle one (i.e. if there are 13 numbers, the median is the value of the 7th number when they are listed in ascending order).

   b) If there is <u>an even number</u> of data points, the median is the average of the middle two numbers.

The **mode** is the <u>most frequent</u> number in a data set. There can be no mode as well as more than one mode.

The range is a measure of spread. It is the difference between the maximum and minimum values in the set.

$$\boxed{\text{Range} = \text{maximum value} - \text{minimum value}}$$

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Panel 3 (Mar 23-11:22 AM)

Ex 2: The marks of a unit math test are as the following: 78, 67, 98, 54, 32, 67, 84, 65.

   a) Calculate the man, median, and mode mark.

   b) Which measure of central tendency best describes these data? Explain.

   c) Determine the range of the data.

Ans:

a) We have 8 marks (n=8) $\text{Mean} = \dfrac{\sum\limits_{i=1}^{n} x_i}{n}$

$$\text{Mean} = \frac{78+67+98+54+32+67+84+65}{8}$$
$$= \frac{545}{8}$$
$$\doteq 68.1$$

- In order to find the median, we will have to rearrange the marks.

~~78, 67, 98, 54, 32, 67, 84, 65~~

32   54   65   67   67   78   84   98

$$\text{Median} = \frac{67+67}{2}$$
$$= 67$$

- The mode is 67.
∴ The mean mark is 68.1%, the median mark is 67% and the modal mark is 67%.

b) Any of the three measures of central tendency would appropriate to describe this data since they are approximately equal.

c) ∴ Range = highest mark - lowest mark
$$= 98 - 32$$
$$= 66$$

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Panel 4 (Oct 15-10:22 AM)

Percent Increase or decrease

Ex 3: Max was trying to sell his car for $15000.00. When it had not sold after several weeks, he lowered the price to $12500.00. What is the percent decrease in price?

Ans:

$$\text{Difference in price} = 15000 - 12500$$
$$= 2500$$

$$\text{Percent decrease} = \left(\frac{\text{Difference in price}}{\text{Original price}}\right) \times 100$$
$$= \left(\frac{2500}{15000}\right) \times 100$$
$$= 16.666$$
$$\doteq 17\%$$

∴ The percent decrease in price is approximately 17%.

Homework: Pg. 192-195

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