

Unit Test Review

- Mean, mode and median
- Quartiles: Q_1 , Q_2 and Q_3
- Percentiles
- Margin of error
- Indices

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Unit Test Review

Example 1: A local high school has 600 students in grade 9, 400 in grade 10, 300 in grade 11 and 200 in grade 12. A sample of 100 students is used to choose which brand of chocolate bar should be sold in the vending machine. Describe how stratified random sampling could be used to obtain the sample. Show calculations.

Ans: $600 + 400 + 300 + 200 = 1500$ students

① $\left(\frac{600}{1500}\right) \times 100 = 0.4$ (or 40%) grade 9's
 $\left(\frac{400}{1500}\right) \times 100 = 27\%$ grade 10's
 $\left(\frac{300}{1500}\right) \times 100 = 20\%$ grade 11's
 $\left(\frac{200}{1500}\right) \times 100 = 13\%$ grade 12's

② 40% of 100 = $0.4 \times 100 = 40$ students from grade 9
 27% of 100 = $0.27 \times 100 = 27$ students from grade 10
 20% of 100 = $0.20 \times 100 = 20$ students from grade 11
 13% of 100 = $0.13 \times 100 = 13$ students from grade 12

Example 2: The marks of a unit math test are as follows: 78, 67, 48, 54, 32, 64, 84, 65.

a) Calculate the mean, median, and mode mark.
 b) Determine the range of the data.

Ans: $n = 8$

a) mean = $\frac{78 + 67 + 48 + 54 + 32 + 67 + 84 + 65}{8} = \frac{545}{8} = 68.125$
 \therefore The mean mark is approx. 68%.

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

32 54 65 67 67 78 84 98

\therefore median = $\frac{67 + 67}{2} = 67$, so the median mark is 67%.

\therefore The modal mark is 67%.

b) Range = highest mark - lowest mark = $98 - 32 = 66$

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Example 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:

$$\text{Percent decrease} = \left(\frac{\text{Price Difference}}{\text{Asking Price}} \right) \times 100\%$$

$$= \left(\frac{15000 - 12500}{15000} \right) \times 100\%$$

$$= \left(\frac{2500}{15000} \right) \times 100\%$$

$$= 16.7\%$$

\therefore The percent decrease in price is approx. 17%.

Example 4: An audio website is testing 30 different models of speakers. These scores are based on a combined rating for quality, reliability, appearance, and cost.

35 41 45 47 50 53 56 58 59 62 62 63 64 65 67 67 67 72 74 75 78 81 82 84 86 88 91 94 98

a) Calculate the first, second and third quartiles.
 b) Calculate the 15th percentile?

Ans: $n = 30$

a) - Find the second quartile (Q_2) first.

$$Q_2 = \frac{t_{15} + t_{16}}{2}$$

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

lower-half: 35 41 45 47 50 53 56 58 59 62 62 63 64 65 67

upper-half: 67 67 72 74 75 78 81 82 84 86 88 91 94 98

$Q_1 = 68 = 58$ (already rearranged)
 $Q_3 = 81$ (same as the median of the data)

\therefore $Q_3 = 81$
 $Q_2 = 67$
 $Q_1 = 58$

b) P_{15} : 15% of 30 = $0.15 \times 30 = 4.5$
 $\therefore P_{15} = t_5$ ← round up to the next $\frac{1}{2}$ term = 50

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Example 5: Given the following data 1 3 4 5 9 15 34 89.

a) Design a misleading graph.
 b) Explaining why the graph is misleading to the reader.

Example 6: The following table shows prices (in Can \$) of items at some baseball parks.

Team	Parking	Cap	Soft Drink	Hot Dog	Beer
Toronto	18.33	7.98	2.44	4.10	8.00
New York	17.35	10.50	3.68	3.68	9.00
Detroit	8.40	8.40	7.63	2.75	5.00

Create an index that calculates the cost of 3 caps, 2 soft drinks, 2 dogs, one beer, and parking. (3 marks)

Ans:

Index Toronto = $3 \times 7.98 + 2 \times 2.44 + 2 \times 4.10 + 8 + 18.33$
 $= 23.94 + 4.88 + 8.20 + 8 + 18.33 = 63.35$

Index New York = $3 \times 10.50 + 2 \times 3.68 + 2 \times 3.68 + 9 + 17.35$
 $= 72.57$

Index Detroit = $3 \times 8.40 + 2 \times 7.63 + 2 \times 2.75 + 5 + 8.40$
 $= 59.36$

- Also know how to read an index and what it means.

Review: Pg. 251: #1-11, 12 ab, 13-15

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