

Here is a Year 9 "Statistics and Probability" exercise set for students in Queensland, covering the three key scope areas you requested.

Year 9 QLD Mathematics: Statistics and Probability Exercise Set

1. Data Representation and Interpretation

1. A class's test scores are: 65, 78, 80, 75, 62, 90, 80, 78, 80, 95. Calculate the **mean** (average) score.
2. Using the same data set from Question 1, determine the **median** score.
3. The heights of 10 students were measured. The **mean** height was 160 cm and the **range** was 25 cm. What does the range tell you about the data?
4. A data set is shown to be **positively skewed** when graphed in a histogram. Describe the typical relationship between the **mean** and the **median** for a positively skewed distribution.
5. Two classes have the following test statistics:
 - Class A: Mean = 70, Range = 15
 - Class B: Mean = 70, Range = 35 Which class performed more **consistently** and why?

2. Data Collection

1. A researcher wants to know the favourite sport of high school students in a city. They survey 100 students from one specific school. Is this an example of **primary** or **secondary** data? Explain your reasoning.
2. Describe one potential **limitation** or **bias** in the data collection method used in Question 1.
3. A politician uses the most recent census data (collected by the government) to understand demographic changes in their electorate. Is the census data a **primary** or **secondary** source for the politician?
4. If you wanted to compare the average temperatures recorded in Brisbane over the last 50 years, would you use **primary** or **secondary** data?
5. Explain the difference between a **population** and a **sample** in a statistical study.

Next

3. Probability

1. A bag contains 5 red marbles, 3 blue marbles, and 2 green marbles. What is the probability of randomly selecting a **blue** marble?
 2. A coin is tossed 50 times. It lands on heads 28 times. What is the **relative frequency** of landing on heads?
 3. A six-sided die is rolled and a coin is tossed. What is the total number of possible **outcomes** for this two-step chance experiment?
 4. Use a **tree diagram** or array to list all possible outcomes when flipping two coins (Coin 1 and Coin 2). What is the probability of getting **exactly one head**?
 5. In a class, the probability of selecting a student who plays football is 0.4. The probability of selecting a student who plays netball is 0.5. If 100 students are in the sample, approximately how many students would you expect to play netball?
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Answers

1. Data Representation and Interpretation

1. **Mean = 78.3** (Sum = 783. Mean = $783/10$)
2. **Median = 79** (Ordered data : 62, 65, 75, 78, **78**, **80**, 80, 80, 90, 95. The median is the average of the two middle scores: $\frac{78+80}{2} = 79$)
3. The **range** tells you the difference between the **tallest** and the **shortest** student in the group. A small range means the data is closely clustered.
4. In a **positively skewed** distribution, the long tail is on the right (positive side). The **Mean** is typically **greater than** the **Median** because the mean is pulled towards the higher values (outliers).
5. **Class A** performed more consistently. A smaller **range** means the scores are **less spread out** and clustered more closely around the mean, indicating less variation in performance.

2. Data Collection

1. **Primary Data.** The researcher is collecting the data **first-hand** directly from the source (the students).
2. **Bias (Non-representative sample):** The sample is taken from **only one school**, which may not be representative of *all* high school students in the entire city (the population of interest). For example, that school might be known for its specific sports program.
3. **Secondary Data.** The politician is using data that was **collected by someone else** (the government) for a different purpose.
4. **Secondary Data.** The temperature records are historical and already exist, so you would use the data that was collected and recorded by the weather bureau or an equivalent organisation.
5. The **population** is the **entire group** being studied (e.g., all Year 9 students in QLD). A **sample** is a **subset** or smaller group selected from the population that is used to gather information about the whole group (e.g., 100 randomly selected Year 9 students).

3. Probability

1. $\frac{3}{10}$ or 0.3 (Total marbles = $5 + 3 + 2 = 10$. $P(\text{Blue}) = \frac{\text{Number of Blue}}{\text{Total}}$)
2. $\frac{28}{50}$ or $\frac{14}{25}$ or 0.56 (Relative Frequency = $\frac{\text{Number of Favourable Outcomes}}{\text{Total Trials}}$)
3. 12 possible outcomes ($6 \text{ sides} \times 2 \text{ coin outcomes} = 12$)
4. **Outcomes:** HH, HT, TH, TT. The total number of outcomes is 4. The outcomes with exactly one head are HT and TH. $P(\text{Exactly one head}) = \frac{2}{4}$ or $\frac{1}{2}$ or 0.5.
5. 50 students (Expected number = Probability $\times$ Number of Trials = 0.5×100)