



S23-test Relative and Expected Frequency: Test Pack

EDEXCEL 1ST0 · Calculator allowed · about 20 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Four key terms are used when studying probability experiments: trial, relative frequency, theoretical probability, expected frequency.

For each description below, write down the term being described.

- (a) One single go at an experiment, such as one throw of a dice or one spin of a spinner. (1)

.....

- (b) The value found by working out (number of times an outcome occurs) divided by (total number of trials). (1)

.....

- (c) A probability worked out using known facts about a fair situation, without needing to carry out an experiment, e.g. $\frac{1}{6}$ for one particular score on a fair dice. (1)

.....

- (d) The value found by working out (probability of an outcome) multiplied by (number of trials). (1)

.....

(Total for Question 1 is 4 marks)

2 A biased four-sided spinner has a probability of 0.3 of landing on red. The spinner is spun 250 times.

(a) Work out the expected number of times the spinner lands on red. (2)

.....
(b) Write down the expected number of times the spinner does not land on red. (1)

.....
(Total for Question 2 is 3 marks)

3 A survey asked 120 students at a school whether they prefer Maths or Art. The two-way table shows the results.

	Maths	Art	Total
Boys	28	32	60
Girls	42	18	60
Total	70	50	120

(a) Calculate the relative frequency that a student chosen at random from this survey prefers Art. (2)

.....
(b) Calculate the relative frequency that a girl in this survey prefers Maths. (2)

.....
(c) The school has 900 students in total, and the proportions in this survey are believed to be representative of the whole school. Use the relative frequency from part (a) to estimate how many of the 900 students prefer Art. (2)

.....
(Total for Question 3 is 6 marks)

- 4** A games manufacturer wants to check whether a new four-sided spinner, used in a board game, is fair. The spinner is labelled 1, 2, 3 and 4, and should give an equal chance of landing on each number.
- (a) State the stage of the statistical enquiry cycle at which the manufacturer decides how many times to spin the spinner before testing it. (1)
- (b) State the stage of the statistical enquiry cycle at which each spin's result is written down in a tally chart. (1)
- (c) The spinner is spun 400 times. It lands on 4 exactly 130 times. State the stage of the statistical enquiry cycle at which the manufacturer would calculate the relative frequency of landing on 4, and calculate this relative frequency. Give your answer to 3 decimal places. (3)
- (d) The theoretical probability of landing on 4 for a fair spinner is $\frac{1}{4} = 0.25$. State the stage of the statistical enquiry cycle at which the manufacturer would draw a conclusion, and comment on whether the spinner appears to be fair. (2)

(Total for Question 4 is 7 marks)

Mark scheme · S23-test Relative and Expected Frequency: Test Pack

Question 1

- (a) **B1** Trial cao
- (a) **Answer: Trial**
- (b) **B1** Relative frequency cao
- (b) **Answer: Relative frequency**
- (c) **B1** Theoretical probability cao
- (c) **Answer: Theoretical probability**
- (d) **B1** Expected frequency cao
- (d) **Answer: Expected frequency**

Question 2

- (a) **M1** 250×0.3 , oe
- (a) **A1** 75 cao
- (a) **Answer: 75**
- (b) **B1** 175 cao, ft from (a): $250 - (a)$
- (b) **Answer: 175**

Question 3

- (a) **M1** $50/120$, oe
- (a) **A1** $5/12$ cao (accept awrt 0.417)
- (a) **Answer: $5/12$**
- (b) **M1** $42/60$, oe
- (b) **A1** $7/10$ cao (or 0.7)
- (b) **Answer: $7/10$**
- (c) **M1** $900 \times 5/12$, oe
- (c) **A1** 375 cao
- (c) **Answer: 375**

Question 4

- (a) **B1** Plan cao
- (a) **Answer: Plan**
- (b) **B1** Collect cao
- (b) **Answer: Collect**
- (c) **B1** Process cao
- (c) **M1** $130/400$, oe
- (c) **A1** 0.325 cao
- (c) **Answer: Process; relative frequency = 0.325**
- (d) **B1** Interpret cao
- (d) **B1** valid comparison, e.g. 0.325 is noticeably higher than the theoretical 0.25, suggesting the spinner may be biased towards landing on 4, though more spins would give a more reliable conclusion, oe
- (d) **Answer: Interpret; 0.325 is higher than the theoretical probability of 0.25, suggesting the spinner may be biased towards 4, though further spins would give a more reliable conclusion.**