5.4 Experimental Probability and Relative Frequency: 30-minute Pack

Calculators not allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A spinner with 4 equal sections is spun 48 times and lands on sector C 18 times. Find the expected frequency for sector C and state how many more times it appeared than expected.

(2)

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2 A biased coin has probability of heads 0.7. It is tossed 10 times and 9 heads are observed. Calculate the relative frequency of heads, the expected number of heads, and the difference experimental minus expected.

(3)

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3 A die is rolled 600 times and the face 6 appears 110 times. Calculate the experimental probability of rolling a 6 as a fraction and as a decimal. Give the theoretical probability and find the difference (experimental minus theoretical).

(4)

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4 A six-sided die is rolled once. State the probability of rolling a 4.

(1)

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5 Lily spins a spinner 80 times and it lands on blue 58 times. Work out the relative frequency of blue. Give your answer as a fraction in its simplest form.

(2)

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6 A die is rolled 300 times and a 6 appears 100 times. If the die is fair, a 6 should appear about 50 times. Does the data suggest that the die is biased? Give a reason.

(2)

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7 A coin is thrown 200 times and lands on heads 148 times. Work out the relative frequency of heads as a decimal, and say whether this is close to 0.5.

(2)

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8 In an experiment a drawing pin is dropped 20 times and lands point up 18 times. Use this to estimate how many times it will land point up in 500 drops.

(3)

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9 The probability that it rains on a given day is 7/10. Estimate the number of days with rain in a period of 500 days.

(2)

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10 A fair coin is tossed 100 times. What is the expected number of tails?

(2)

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Mark scheme · 5.4 Experimental Probability and Relative Frequency: 30-minute Pack

Question 1

expected frequency 1/4 of 48 = 12 shown	M1
experimental 18 so 18 - 12 = 6 more cao	A1

Answer: **Expected 12; experimental 18; 6 more**

Question 2

relative frequency calculated as 9/10	M1
expected number shown as 10 x 0.7 = 7	M1
difference 9 - 7 = 2 cao	A1

Answer: **0.9; expected 7; difference 2**

Question 3

experimental probability as fraction 110/600 simplified to 11/60	M1
convert to decimal 11/60 = 0.183333... shown	M1
theoretical probability 1/6 = 0.166666... stated	M1
difference 11/60 - 1/6 = 1/60 (about 0.016666...) cao	A1

Answer: **11/60 (0.18333...); theoretical 1/6 (0.16666...); difference 1/60 (about 0.01667)**

Question 4

1/6 or about 0.166... or 16.7% cao	B1

Answer: **1/6**

Question 5

58/80	M1
29/40 cao	A1

Answer: **29/40**

Question 6

relative frequency 100/300 = 1/3 compared with 1/6, oe (accept 100 compared with the expected 50)	M1
The relative frequency is much higher than 1/6, so the die may be biased	A1

Answer: **The relative frequency is much higher than 1/6, so the die may be biased**

Question 7

148/200	M1
0.74 and a correct comparison	A1

Answer: **0.74; not close to 0.5**

Question 8

relative frequency 9/10	M1
9/10 x 500	M1
450 cao	A1

Answer: **450**

Question 9

7/10 x 500	M1
350 cao	A1

Answer: **350**

Question 10

method: 1/2 of 100 or 100 x 0.5	M1
50 cao	A1

Answer: **50**

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