FOUNDATION & HIGHER

SAME AT BOTH TIERS

Name ..... Class .....

# P5: Sample size

*Solve problems using relative frequency from samples*

20 marks · 25 minutes · Non-calculator

**1)** Three students did 20, 50 and 130 trials, getting 6, 17 and 37 successes. Combine the results to estimate the probability of success, and estimate the number of successes in 500 trials.

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**[Question 1: 3 marks]**

**2)** A coin landed on heads 230 times in 400 flips. After 600 more flips there had been 520 heads in total. Find both relative frequencies and comment on whether the coin seems biased.

**[Question 2: 3 marks]**

**3)** The relative frequency of red was 0.36 after 50 spins and 0.31 after 500 spins. Estimate how many reds there will be in the next 100 spins.

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**[Question 3: 2 marks]**

**4)** A drawing pin landed point up 180 times in 300 drops. Estimate the probability that two dropped pins both land point up.

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**[Question 4: 3 marks]**

**5)** From 900 rolls, $P(6)$ is estimated to be 0.3. How many more sixes than expected for a fair dice were rolled?

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**[Question 5: 2 marks]**

**6)** A bus was late on 6 of 40 days. Estimate how many of the 190 school days it will be late.

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**[Question 6: 3 marks]**

**7)** Bag A gave a relative frequency of 0.42 after 100 trials. Bag B (identical) gave 0.38 after 400 trials. Find the relative frequency for all the trials combined.

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**[Question 7: 4 marks]**

**End of paper – 20 marks in total**

# Answers and brief mark scheme

| Q | Answer | Method / notes |
|---|---|---|
| 1 | 0.3; 150 | 60 successes in 200 (P1, P1); 150 (A1). |
| 2 | 0.575 and 0.52 | Both relative frequencies (P1, P1); closer to 0.5 with more trials, so probably fair or only slightly biased (C1). |
| 3 | 31 | Use 0.31 as more trials (P1); A1. |
| 4 | 0.36 | 0.6 (P1); $0.6 \times 0.6$ (P1); A1. |
| 5 | 120 | 270 sixes (P1); $270 - 150$ (A1). |
| 6 | 28 or 29 | $\frac{6}{40} = 0.15$ (P1); $0.15 \times 190 = 28.5$ (P1); A1. |
| 7 | 0.388 | 42 and 152 successes (P1, P1); $\frac{194}{500}$ (P1); A1. |