FOUNDATION & HIGHER

SAME AT BOTH TIERS

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

P2: Expected outcomes

Randomness, fairness and expected outcomes

20 marks · 25 minutes · Non-calculator

1) A fair dice is rolled 120 times. How many sixes would you expect?

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[Question 1: 1 marks]

2) The probability that a spinner lands on red is 0.35. It is spun 200 times. How many times would you expect it to land on red?

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[Question 2: 1 marks]

3) A fair coin is flipped 50 times. How many heads would you expect?

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[Question 3: 1 marks]

4) A bag has 3 red, 5 blue and 2 green counters. A counter is taken at random and put back. This is done 150 times. How many times would you expect a blue counter?

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[Question 4: 2 marks]

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5) A spinner lands on A, B or C. $P(A) = 0.2$ and $P(B) = 0.45$. It is spun 300 times. How many times would you expect it to land on C?

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[Question 5: 2 marks]

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6) Is each game fair? Write "fair" or "not fair".

(a) A fair coin is flipped. Ann wins on heads, Bob wins on tails.

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(1)

(b) A fair dice is rolled. Ann wins on 1 or 2, Bob wins on 3, 4, 5 or 6.

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(1)

[Question 6: 2 marks]

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7) A fair dice is rolled 90 times. How many times would you expect

(a) an even number?

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(1)

(b) a prime number?

.....

(1)

[Question 7: 2 marks]

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8) A raffle sells 500 tickets and there are 25 prizes. Each ticket can win at most one prize.

(a) What is the probability that a ticket wins a prize?

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(1)

(b) Ella buys 20 tickets. How many prizes would she expect to win?

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(1)

[Question 8: 2 marks]

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9) The relative frequency of an event is 0.15. Estimate how many times it will happen in 600 trials.

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[Question 9: 1 marks]

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10) A game costs £1 to play. The probability of winning £5 is 0.1. The game is played 200 times. How much profit should the organiser expect?

£ .....

[Question 10: 2 marks]

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11) Two fair coins are flipped together 80 times. How many times would you expect both to land on heads?

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[Question 11: 2 marks]

12) What does it mean to choose an item "at random"?

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[Question 12: 1 marks]

13) A card is taken at random from a normal pack of 52 cards and then replaced. This is done 260 times. How many hearts would you expect?

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[Question 13: 1 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	20	B1.
2	70	B1.
3	25	B1.
4	75	$\frac{5}{10} \times 150$ (M1); A1.
5	105	$P(C) = 0.35$ (M1); A1.
6	(a) fair (b) not fair	B1 each.
7	(a) 45 (b) 45	B1 each.
8	(a) $\frac{1}{20}$ (b) 1	B1 each.
9	90	B1.
10	£100	Expected wins 20, payout £100 (M1); 200 − 100 (A1).
11	20	$P = \frac{1}{4}$ (M1); A1.
12	Every item is equally likely to be chosen	B1.
13	65	B1.