Foundation GCSE: Listing Outcomes

Name: _____ Class: _____

Instructions: Answer all questions. Questions are ordered from easiest (1) to hardest (20). Working out should be shown where appropriate.

1. List all possible outcomes when a fair coin is flipped twice.

2. A menu offers starters {Soup, Tart} and mains {Pizza, Pasta, Curry}. How many combinations are there?

3. Two fair coins are flipped. Find P(two heads).

4. List all possible outcomes when picking one letter from {A, B} and one number from $\{1, 2, 3\}$.

5. A spinner has 3 sections (1, 2, 3) and a coin is flipped. How many total outcomes are there?

6. Two fair 4-sided dice (1, 2, 3, 4) are rolled. List all outcomes that give a total score of 5.

7. Using Q6, find P(total score of 5) as a simplified fraction.

8. A girl has 3 tops and 4 skirts. How many different top-and-skirt outfits can she make?

9. A coin is flipped and a standard 6-sided die is rolled. Find P(Head and an even number).

10. List all possible two-digit numbers using digits 2, 5, and 8 without repeating any digit.

11. Two fair 6-sided dice are rolled. How many total outcomes are possible in the sample space?

12. Two fair 6-sided dice are rolled. Find P(getting a double).

13. List all outcomes when rolling two fair 4-sided dice where the difference between scores is 1.

14. A lock uses a 2-digit code using digits 1, 2, 3, 4. Digits can be repeated. How many codes are possible?

15. Three coins are flipped. List all outcomes that give exactly two heads.

16. Three coins are flipped. What is P(at least two heads)?

17. A bag has cards 1, 2, 3. Two cards are picked without replacement. List all possible pairs.

18. Using Q17, find P(sum of cards is odd).

19. How many unique 3-letter arrangements can be made using the letters A, B, C without repetition?

20. A menu offers 3 starters, N mains, and 2 desserts. There are 30 possible 3-course meals. Find N.

Answers & Worked Solutions

1. HH, HT, TH, TT – 4 possible outcomes.
2. $6 - 2 \times 3 = 6$.
3. $\frac{1}{4}$ – 1 outcome (HH) out of 4.
4. (A,1), (A,2), (A,3), (B,1), (B,2), (B,3) – 6 outcomes.
5. $6 - 3 \times 2 = 6$.
6. (1,4), (2,3), (3,2), (4,1) – 4 outcomes.
7. $\frac{1}{4}$ – Total outcomes $= 4 \times 4 = 16$. $\frac{4}{16} = \frac{1}{4}$.
8. $12 - 3 \times 4 = 12$.
9. $\frac{1}{4}$ – Outcomes: (H,2), (H,4), (H,6) out of 12. $\frac{3}{12} = \frac{1}{4}$.
10. 25, 28, 52, 58, 82, 85 – 6 numbers.
11. $36 - 6 \times 6 = 36$.
12. $\frac{1}{6}$ – Doubles: (1,1), (2,2), (3,3), (4,4), (5,5), (6,6). $\frac{6}{36} = \frac{1}{6}$.
13. (1,2), (2,1), (2,3), (3,2), (3,4), (4,3) – 6 outcomes.
14. $16 - 4 \times 4 = 16$.
15. HHT, HTH, THH – 3 outcomes.
16. $\frac{1}{2}$ – Total outcomes = 8. Outcomes with ≥ 2 heads: HHH, HHT, HTH, THH (4 outcomes). $\frac{4}{8} = \frac{1}{2}$.
17. (1,2), (1,3), (2,1), (2,3), (3,1), (3,2) – 6 outcomes.
18. $\frac{2}{3}$ – Odd sum pairs: (1,2), (2,1), (2,3), (3,2) (4 outcomes). $\frac{4}{6} = \frac{2}{3}$.
19. 6 – ABC, ACB, BAC, BCA, CAB, CBA ($3! = 6$).
20. $5 - 3 \times N \times 2 = 30 \implies 6N = 30 \implies N = 5$.