GCSE HIGHER · REVISION MAT 2

Fairness and expected outcomes

1 For a fair coin, is P(head) = P(tail)?

Explain.

2 A fair 8-sided dice is numbered 1 to 8.

Find P(prime).

3 A coin lands heads 60 times in 100 flips.

Does this prove the coin is biased? Explain.

4 Two dice are rolled.

A wins if the total is 7; B wins if the total is 6 or 8.

Is the game fair?

5 Show that P(even) = P(odd) on a fair dice.

6 A bag has 3 red and 5 blue balls.

How many red balls must be added to make P(red) = $\frac{1}{2}$?

7 Explain why past results do not affect the next roll of a fair dice.

8 A spinner has 6 equal sections: 1, 2, 2, 3, 3, 3.

You win the number shown in pounds.

It costs £2.50 to play. Is it fair?

Mr&Mrs MATHS

ANSWERS · REVISION MAT 2

Fairness and expected outcomes

1 Yes: two equally likely outcomes, $\frac{1}{2}$ each.

2 2, 3, 5, 7

$\frac{1}{2}$

3 No: 60 could happen by chance; more flips are needed.

4 P(7) = $\frac{6}{36}$

P(6 or 8) = $\frac{10}{36}$

No: it favours B.

5 3 even and 3 odd scores: $\frac{1}{2}$ each

6 Need equal numbers

2

7 Each roll is independent.

8 Expected win $\frac{1 + 4 + 9}{6}$ = £2.33

Not fair: lose 17p on average.

Mr&Mrs MATHS