

Relative frequency

Starter

1. A bag contains hundreds of glass marbles, each one coloured either red, orange, green or blue. There are more than 2 marbles of each colour. Marbles are drawn randomly from the bag, one at a time, and not replaced. How many marbles must be drawn from the bag in order to ensure that at least three marbles of the same colour are drawn?

Working: If 8 marbles are chosen, then in the worst case, it is possible to have two of each colour and so not fulfil the condition. The ninth marble to be drawn, however, will be the third of that colour, and so nine marbles are needed to ensure that three of the same colour are drawn.

2. Discuss:
- (a) How could we estimate the percentage of black cars that pass the school each day?
- (b) How could we make our answer more accurate?

Working: (a) Count the number of black cars that pass the school in an hour and multiply up.

(b) Count the number of black cars that pass the school on more days and for a longer time.

E.g. 1 A factory makes shirts and wants to know how many of each size to make. It measures people in a town

Size	S	M	L	XL
Frequency	32	45	51	37

What is the relative frequency of size M?

Working: Add all the frequencies up: $32 + 45 + 51 + 37 = 165$
Relative frequency of M = $\frac{45}{165} = \frac{3}{11} = 0.27$

E.g. 2 A dice is rolled 60 times and the frequency of rolls is below. Is the dice biased?

Number	1	2	3	4	5	6
Frequency	9	13	11	12	7	8

Working: Theoretical probability says there should be 10 rolls of each number. However, it is unlikely to get exactly 10 rolls. The frequencies are close to 10 so the dice is probably not biased.

E.g. 3 The table shows the results of rolling a dice 200 times

Number	1	2	3	4	5	6
Frequency	54	12	38	9	61	26

- (a) What is the relative frequency of rolling an odd number? Give your answer as a decimal.
- (b) John says “If I roll the dice I am likely to get a 5.” Criticise John’s statement.

Working: (a) Add the frequencies for odd numbers: $54 + 38 + 61 = 153$
Relative frequency of rolling an odd number = $\frac{153}{200} = 0.765$

N.B. This suggests the dice is biased.

- (b) Relative frequency is $\frac{61}{200} = 0.305 < 0.5$, so it is actually unlikely to get a 5.

Video: [Relative frequency](#)

[Solutions to Starter and E.g.s](#)

Exercise

9-1 class textbook: p232 M8.1 Qu 1-3
A*-G class textbook: p202 M8.1 Qu 1-3
9-1 homework book: p77 M8.1 Qu 1-4
A*-G homework book: p56 M8.1 Qu 1-4

[Homework book answers \(only available during a lockdown\)](#)