Expected outcome

Use Expected value $= n \times p$ to predict how many times an event will occur over n trials.

Name ____________________ **Date** ____________________

Show your method

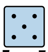
Expected value $= n \times p$, where n is the number of trials and p is the theoretical probability. This is a prediction, not a guaranteed result.

Worked example A biased coin has $P(\text{heads}) = 0.4$. It is flipped 80 times. Find the expected number of heads.

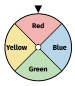
Heads

Expected value $= n \times p$.
$= 80 \times 0.4 = 32$

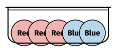
1. A fair die is rolled 90 times. How many times would you expect a 5?


Face 5

2. This spinner is spun 60 times. How many times would you expect blue?



3. Drawn (and replaced) 40 times. How many reds expected?

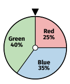


4. $P(\text{rain tomorrow}) = 0.3$. Over 20 similar days, how many rainy days expected?

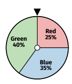
5. 20% of emails are spam. In an inbox of 150 emails, how many expected to be spam?

6. What does the expected value of an event tell you?

7. Spun 120 times. Find the expected number of Blue.



8. Using the same spinner, find the expected number of Green.



9. A spinner lands on yellow with probability 0.05. If 4 yellows are expected, how many times was it spun?

Expected outcome (continued)

Read a probability table, then work backwards for n or p.

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10. 250 trials. Find the expected frequency of Green.

Colour	Red	Blue	Green
Probability	0.2	0.5	0.3

11. Using the same table, find the expected frequency of Red OR Blue combined.

Colour	Red	Blue	Green
Probability	0.2	0.5	0.3

12. A die is rolled 48 times, expecting 8 sixes. What probability of a six does this imply?

13. A weighted coin has $P(\text{heads}) = 0.65$. Flipped n times, 130 heads are expected. Find n.

14. A frequency tree shows 54 of 90 sport-players also play an instrument (LO2). At this rate, how many of a new group of 60 sport-players would you expect to?

15. Explain why the actual sixes rolled in 60 rolls of a fair die might not be exactly 10, even though 10 is expected.

16. A game has an independent $P(\text{win}) = 0.12$ each play. Over 500 plays, how many wins are expected?

17. A sample of 25 sweets contains 6 red. The maker claims 20% are red. Show the expected number for comparison, and say if 6 is roughly consistent.

18. A spinner is spun 50 times and a colour occurs 10 times (its expected count). Find the new expected count if spun 500 times.