

Relative Frequency

Foundation tier | Written solutions

ESTIMATING FREQUENCIES

Question 1

Expected passes = $0.8 \times 200 = 160$ students.

Question 2

Expected bulbs lasting more than a year = $0.75 \times 120 = 90$ bulbs.

Question 3

Expected trains on time = $0.92 \times 85 = 78.2$. As trains are whole, an estimate is about 78 trains.

Question 4

Probability the battery does not last all day = $1 - 0.85 = 0.15$.

Expected number = $0.15 \times 60 = 9$ phones.

Question 5

Probability of no broken biscuit = $1 - 0.1 = 0.9$.

Expected number = $0.9 \times 300 = 270$ packets.

Question 6

Probability a customer does not leave a review = $1 - 0.35 = 0.65$.

Expected number = $0.65 \times 240 = 156$ customers.

COMPLETING PROBABILITY TABLES

Question 7

a) Probabilities total 1, so $P(\text{blue}) = 1 - 0.25 - 0.4 - 0.15 = 0.2$.

b) Expected red counters = $0.25 \times 200 = 50$.

Question 8

$P(\text{green}) = 1 - 0.18 - 0.37 - 0.29 = 0.16$.

Blue and green are separate outcomes, so $P(\text{blue or green}) = 0.18 + 0.16 = 0.34$.

Question 9

- a) Convert $1/5 = 0.2$ and $3/10 = 0.3$. $P(\text{yellow}) = 1 - 0.2 - 0.3 - 0.27 = 0.23$.
b) Expected blue counters = $(1/5) \times 500 = 100$.

Question 10

Red and yellow account for $0.3 + 0.24 = 0.54$. The remaining probability is $1 - 0.54 = 0.46$.
Blue and green are equally likely, so each is $0.46 \div 2 = 0.23$. Completed table: blue 0.23, red 0.30, green 0.23, yellow 0.24.

Question 11

- a) After blue and green, probability remaining for red and yellow is $1 - 0.2 - 0.35 = 0.45$.
Let $P(\text{yellow}) = y$ and $P(\text{red}) = 2y$. Then $3y = 0.45$, so yellow = 0.15 and red = 0.30.
b) $P(\text{red or green}) = 0.30 + 0.35 = 0.65$. Expected number = $0.65 \times 500 = 325$.

USING COUNTS TO FIND A TOTAL**Question 12**

$P(\text{yellow}) = 1 - 0.3 - 0.25 - 0.1 = 0.35$.
Seven yellow pens represent 35% of the box. Total number of pens = $7 \div 0.35 = 20$.

Question 13

$P(\text{green}) = 1 - 0.35 - 0.2 - 0.15 = 0.30$.
If 30% corresponds to 18 counters, total = $18 \div 0.30 = 60$. Red counters = $0.2 \times 60 = 12$.

Question 14

$P(\text{yellow}) = 1 - 0.4 - 0.15 - 0.25 = 0.20$.
If 20% corresponds to 12 pens, total = $12 \div 0.20 = 60$. Red pens = $0.15 \times 60 = 9$.