

Conditional Probability: Two-way Tables

ANSWERS

1 'given' shrinks the group

A student is chosen at random.

Given that the student is in Year 10, find the probability that the student walks to school.

	Walk	Bus	Total
Year 10	18	12	30
Year 11	15	25	40
Total	33	37	70

Look at Year 10 Total 30

Of these, Walk 18

Probability $\frac{18}{30}$

2

A member is chosen at random.

Given that the member is a child, find the probability that the member swims.

	Swim	Gym	Total
Adult	24	36	60
Child	28	12	40
Total	52	48	100

Look at Child Total 40

Of these, Swim 28

Probability $\frac{28}{40}$

3

A customer is chosen at random.

Given that the customer orders tea, find the probability that the customer takes away.

	Eat in	Take away	Total
Tea	14	6	20
Coffee	22	38	60
Total	36	44	80

Look at Tea Total 20

Of these, Take away 6

Probability $\frac{6}{20}$

4

A student is chosen at random. **Given that** the student is right-handed, find the probability that the student wears glasses.

	Glasses	No glasses	Total
Left	4	8	12
Right	21	47	68
Total	25	55	80

Look at Right Total 68

Of these, Glasses 21

Probability $\frac{21}{68}$

5 Notice the change!

A student is chosen at random. **Given that** the student has a packed lunch, find the probability that the student is in Year 8.

	Packed	School	Total
Year 7	32	48	80
Year 8	28	52	80
Total	60	100	160

Look at Packed Total 60

Of these, Year 8 28

Probability $\frac{28}{60}$

6

A worker is chosen at random. **Given that** the worker cycles to work, find the probability that the worker works full time.

	Drive	Cycle	Total
Full time	45	15	60
Part time	27	13	40
Total	72	28	100

Look at Cycle Total 28

Of these, Full time 15

Probability $\frac{15}{28}$

7

A person is chosen at random.

Given that the person is 30 or over, find the probability that the person prefers the theatre.

	Cinema	Theatre	Total
Under 30	34	6	40
30 or over	26	14	40
Total	60	20	80

14 out of the 40 in 30 or over

Probability $\frac{14}{40}$

8

A student is chosen at random. **Given that** the student studies Spanish, find the probability that the student is in Year 9.

	French	Spanish	Total
Year 9	40	35	75
Year 10	22	53	75
Total	62	88	150

35 out of the 88 in Spanish

Probability $\frac{35}{88}$

Conditional Probability: Two-way Tables further practice

ANSWERS

9

The table shows the phones of 90 people. A person is chosen at random. **Given that** the person is under 30, find the probability that they use an iPhone.

	Android	iPhone	Total
Under 30	18	30	48
30 and over	27	15	42
Total	45	45	90

Answer $\frac{30}{48} = \frac{5}{8}$

10

100 students said how they travel to school. Complete the table. A student is chosen at random. **Given that** the student walks, find the probability that they are in Year 11.

	Bus	Walk	Car	Total
Year 10	22	15	13	50
Year 11	18	25	7	50
Total	40	40	20	100

Answer $\frac{25}{40} = \frac{5}{8}$

11

The table shows how students in two year groups get to school. More Year 11 students walk. Is a Year 10 or a Year 11 student more likely to walk? Show how you know.

	Walk	Other	Total
Year 10	18	27	45
Year 11	21	39	60
Total	39	66	105

$\frac{18}{45} = 0.4$ and $\frac{21}{60} = 0.35$

Answer Year 10

12

200 people visited a zoo. 110 were adults. 40% of the adults and 27 of the children bought a guidebook. Draw and complete a two-way table. A visitor who bought a guidebook is chosen at random. Find the probability that they are an adult.

	Guide	No guide	Total
Adult	44	66	110
Child	27	63	90
Total	71	129	200

44 out of the 71 who bought one

Answer $\frac{44}{71}$

13

The table shows the 80 members of a leisure club. **Given that** a member is a junior, the probability that they swim is $\frac{3}{5}$. Complete the table. **Given that** a member swims, find the probability that they are a junior.

	Swim	Gym	Total
Junior	15	10	25
Adult	30	25	55
Total	45	35	80

$\frac{3}{5}$ of 25 = 15, then 15 out of 45

Answer $\frac{1}{3}$

14

A café records the drinks it sells. Is the choice of drink independent of the time of day? Show how you know.

	Tea	Coffee	Total
Morning	18	27	45
Afternoon	12	18	30
Total	30	45	75

$P(\text{tea}) = \frac{30}{75} = \frac{2}{5}$, given morning
 $\frac{18}{45} = \frac{2}{5}$

Answer Yes

15

The table shows 80 students. Two of the left-handed students are chosen at random, without replacement. Find the probability that both wear glasses.

	Glasses	No glasses	Total
Left	4	8	12
Right	21	47	68
Total	25	55	80

$\frac{4}{12} \times \frac{3}{11} = \frac{12}{132}$

Answer $\frac{1}{11}$

16

A spam filter checked 1000 emails. Ben says: "It flags 90% of spam emails, so an email it flags is very likely to be spam." Is Ben right? Show how you know.

	Flagged	Not flagged	Total
Spam	45	5	50
Not spam	95	855	950
Total	140	860	1000

given flagged: 45 out of 140, less than a half

Answer No, only $\frac{9}{28}$