



3.20D Two Way Tables: Fluency and Exam Drill

EDEXCEL Edexcel 1MA1 · Calculator allowed · about 45 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** A teacher records which pupils passed or failed a short test and whether they are boys or girls. Complete the missing entry in this two-way table.

Passed Failed Total

Boys 28 7 35

Girls ? 5 13

Total 36 12 48

Work out the number of girls who passed.

(Total for Question 1 is 1 mark)

-
- 2** In a group of 36 pupils, 21 play music and 15 do not. There are 14 boys and 22 girls. Of the boys, 9 play music.

Complete the missing entry: how many girls do not play music?

(Total for Question 2 is 1 mark)

- 3** A survey of 40 pupils asked whether they prefer tea or coffee. Complete the two missing entries in the table.

Tea	Coffee	Total
Year 10	12	8
Year 11	10	?
Total	22	?

Find Year 11 coffee and the total who prefer coffee.

(Total for Question 3 is 2 marks)

- 4** A school has 50 pupils. 30 buy fruit from the canteen and 20 do not.

Work out the probability that a randomly chosen pupil buys fruit.

(Total for Question 4 is 1 mark)

- 5** A two-way table records pupils who play football and their gender. There are 35 pupils in total. 11 boys play football and 18 pupils play football overall. There are 15 girls in the class.

Work out the probability that a randomly chosen pupil is a girl who plays football.

(Total for Question 5 is 1 mark)

- 6** In a sports club there are 24 boys. 9 of the boys play hockey. Work out the probability that a member chosen at random from the boys plays hockey.

(Total for Question 6 is 2 marks)

- 7 A census of 80 households gives:
31 have a dog, 28 have a cat, 10 have both a dog and a cat.

Complete the 2 by 2 table and find how many households have neither a dog nor a cat.

(Total for Question 7 is 2 marks)

- 8 Complete this two-way table and give the column totals.

Football Hockey Total

Boys 15 ? 30

Girls 9 11 20

Total ? ? 50

Find the missing entries.

(Total for Question 8 is 3 marks)

- 9** A survey of 250 people records age and usual transport.
Complete the table then answer the probabilities.

Bus	Car	Walk	Total
Under 30	40	30	? 90
30 to 59	70	40	30 140
60 and over	?	10	0 20
Total	120	80	50 250

- (a) Complete the three missing entries.
(b) Work out the probability that a randomly chosen person uses the bus.
(c) Find the probability that a person uses the bus given they are aged 30 to 59.

(a) Complete the three missing entries in the table. (2)

(b) Work out the probability that a randomly chosen person uses the bus. (1)

(c) Find the probability that a person uses the bus given they are aged 30 to 59. (1)

(Total for Question 9 is 4 marks)

10 A sample of 200 households records whether they have internet and whether they have a landline. The proportions are:

$P(\text{internet}) = 0.70$, $P(\text{landline}) = 0.40$, $P(\text{both}) = 0.30$.

- (a) Complete the two-way table of counts for the 200 households.
- (b) Work out the probability that a household has internet but not a landline.
- (c) Find the probability that a household has a landline given it does not have internet.

(a) Complete the counts table for 200 households. (2)

(b) Work out the probability that a household has internet but not a landline. (1)

(c) Find the probability that a household has a landline given it does not have internet. (1)

(Total for Question 10 is 4 marks)

11 In a town of 200 adults, 50 smoke, 120 drink alcohol, and 30 both smoke and drink.

Show that the probability that a randomly chosen adult either smokes or drinks is 0.7. Give all steps.

(Total for Question 11 is 3 marks)

- 12** A survey of 300 people records gender and whether they smoke. Complete the table and test whether 'smokes' and 'female' are independent.

	Smokes	Does not smoke	Total
Female	50	110	160
Male	?	?	140
Total	90	210	300

(a) Complete the two missing entries.

(b) Use probabilities to decide whether smoking and being female are independent. Show your working and conclude.

(a) Complete the two missing entries in the table. **(1)**

(b) Are the events 'smokes' and 'female' independent? Show your working and give a conclusion. **(3)**

(Total for Question 12 is 4 marks)

Mark scheme · 3.20D Two Way Tables: Fluency and Exam Drill

Question 1

- **B1** 8 cao
- **Answer: 8**

Question 2

- **B1** 10 cao
- **Answer: 10**

Question 3

- **M1** use row total to find Year 11 coffee = $20 - 10 = 10$ oe
- **A1** coffee total = $8 + 10 = 18$ cao
- **Answer: Year 11 coffee = 10; Coffee total = 18**

Question 4

- **B1** $30/50 = 3/5$ or 0.6 cao
- **Answer: 3/5 or 0.6**

Question 5

- **B1** girls who play = $18 - 11 = 7$ so probability = $7/35 = 1/5$ cao
- **Answer: 1/5**

Question 6

- **M1** write $9/24$ oe
- **A1** $3/8$ cao
- **Answer: 3/8**

Question 7

- **M1** use inclusion-exclusion: at least one = $31 + 28 - 10 = 49$ oe
- **A1** neither = $80 - 49 = 31$ cao
- **Answer: 31**

Question 8

- **M1** boys hockey = $30 - 15 = 15$ oe
- **M1** football total = $15 + 9 = 24$ and hockey total = $15 + 11 = 26$ oe
- **A1** entries: Boys hockey 15; Football total 24; Hockey total 26 cao
- **Answer: Boys hockey = 15; Football total = 24; Hockey total = 26**

Question 9

- (a) **M1** Under 30 walk = $90 - 40 - 30 = 20$; 60+ bus = $20 - 10 - 0 = 10$ oe
- (a) **A1** column totals consistent: Bus $40+70+10 = 120$, so Walk total $20+30+0 = 50$ cao
- (a) **Answer: Under 30 Walk = 20; 60+ Bus = 10; Totals: Bus 120, Car 80, Walk 50**
- (b) **B1** $120/250 = 12/25 = 0.48$ cao
- (b) **Answer: 12/25 or 0.48**
- (c) **B1** $P(\text{bus} \mid 30 \text{ to } 59) = 70/140 = 1/2$ cao
- (c) **Answer: 1/2**

Question 10

- (a) **M1** both = $0.30 \times 200 = 60$ and internet only = $0.70 \times 200 - 60 = 80$ oe
- (a) **A1** landline only = $0.40 \times 200 - 60 = 20$; neither = $200 - (60 + 80 + 20) = 40$ cao
- (a) **Answer: Both 60; Internet only 80; Landline only 20; Neither 40**
- (b) **B1** $80/200 = 2/5 = 0.4$ cao
- (b) **Answer: 2/5 or 0.4**
- (c) **B1** $P(\text{landline} \mid \text{no internet}) = 20/60 = 1/3$ cao (no internet total = 20 landline-only + 40 neither = 60)
- (c) **Answer: 1/3**

Question 11

- **M1** use formula $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ cso
- **M1** substitute: $50/200 + 120/200 - 30/200 = (50 + 120 - 30)/200 = 140/200$ cso
- **A1** 0.7 cao cso
- **Answer: 0.7**

Question 12

- (a) **B1** Male smokes = $90 - 50 = 40$; Male does not smoke = $140 - 40 = 100$ cao
- (a) **Answer: Male smokes = 40; Male does not smoke = 100**
- (b) **M1** compute $P(\text{smokes and female}) = 50/300 = 1/6$ oe
- (b) **M1** compute $P(\text{smokes}) \times P(\text{female}) = (90/300) \times (160/300) = 48/300$ oe
- (b) **C1** because $50/300$ is not equal to $48/300$ conclude not independent, with reason given
- (b) **Answer: Not independent, since $P(\text{smokes and female}) = 50/300$ whereas $P(\text{smokes})P(\text{female}) = 48/300$, so they are not equal.**