# 3.20 Two Way Tables: Test Pack

EDEXCEL 1MA1 · Calculator allowed · about 65 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

**Answer ALL questions. Show all your working.**

**1** A school asked 60 pupils whether they walk or cycle to school and whether they have a school lunch or a packed lunch. The table below is partly completed.

| | Walk | Cycle | Total |
|---|---|---|---|
| School lunch | 28 | 8 | 36 |
| Packed lunch | 20 | ? | 24 |
| Total | 48 | 12 | 60 |

Work out the missing entry marked ? in the table.

**(Total for Question 1 is 1 mark)**

**2** Priya records whether pupils in her maths class prefer pencils or pens and whether they do homework every day. The table shows the results for 30 pupils.

| | Pencil | Pen | Total |
|---|---|---|---|
| Every day | 10 | 6 | 16 |
| Not every day | ? | 8 | 14 |
| Total | 16 | 14 | 30 |

Find the missing entry marked ?.

**(Total for Question 2 is 2 marks)**


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**3** Of 53 boys, 39 are in Year 10 and the rest are in Year 11. Of 39 girls, 19 are in Year 10 and the rest are in Year 11.

What percentage of the girls are in Year 10? Give your answer correct to 1 decimal place.

**(Total for Question 3 is 3 marks)**


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**4** Year 10 has 24 boys and 17 girls. Year 11 has 25 boys and 11 girls.
Write the ratio of all the boys to all the girls in its simplest form.

**(Total for Question 4 is 3 marks)**

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**5** Mr Choudhury owns a corner shop. He recorded how 200 customers paid for their shopping, and whether they shopped in the morning or the evening. The completed two-way table is shown below.

| | Morning | Evening | Total |
|---|---|---|---|
| **Card** | 60 | 70 | **130** |
| **Cash** | 40 | 30 | **70** |
| **Total** | **100** | **100** | **200** |

**(a)** Write down the total number of customers who shopped in the morning. **(1)**

.....

**(b)** Work out the percentage of all 200 customers who paid by cash. **(2)**

.....

**(c)** A customer who shopped in the evening is chosen at random. Work out the probability that they paid by card. **(2)**

.....

**(Total for Question 5 is 5 marks)**


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**6** Ms Bianchi, a form tutor, asked 50 students whether they prefer Maths or English. 28 of the students are boys. Of the boys, 12 prefer Maths. Of the girls, 18 prefer English.

**(a)** Draw and complete a two-way table to show this information. **(5)**

**(b)** Write down the number of girls who prefer Maths. **(1)**

.....

**(c)** One student is chosen at random from the 50 students. Find the probability that this student prefers Maths. **(2)**

.....

**(Total for Question 6 is 8 marks)**

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**7** A bakery asked 60 customers whether they bought bread and whether they bought cake. The completed two way table is below.

| | Bought cake | Did not buy cake | Total |
|---|---|---|---|
| Bought bread | 20 | 10 | 30 |
| No bread | 15 | 15 | 30 |
| Total | 35 | 25 | 60 |

Work out the probability that a customer bought cake given that they did not buy bread. Give your answer as a fraction in lowest terms.

**(Total for Question 7 is 3 marks)**


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**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)**

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**9** A survey of 120 students recorded whether they take Biology and whether they take Drama. The table below is started for the results.

| | Drama | Not Drama | Total |
|---|---|---|---|
| Biology | 28 | 22 | 50 |
| Not Biology | | | 70 |
| Total | 40 | | 120 |

Complete the missing entries in the table.

**(Total for Question 9 is 2 marks)**

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**10** 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 10 is 3 marks)**


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**11** 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 in the table. **(1)**

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

**(Total for Question 11 is 4 marks)**


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**12** The table below shows results from a taste test of 200 people for two flavours, Lemon and Berry, and whether they preferred Brand X.

| | Prefer Brand X | Do not prefer Brand X | Total |
|---|---|---|---|
| Lemon | 54 | 26 | 80 |
| Berry | a | b | 120 |
| Total | 110 | 90 | 200 |

Find the values of a and b.

**(Total for Question 12 is 4 marks)**

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**13** A medical study records 600 patients and classifies them by whether they received Treatment A and whether they recovered within 30 days. The two-way table is incomplete:

| | Recovered | Not recovered | Total |
|---|---|---|---|
| Treatment A | 210 | 90 | 300 |
| No A | c | 180 | 300 |
| Total | 330 | 270 | 600 |

**(a)** Find c. **(1)**

**(b)** Calculate P(recovered | No A) to 3 significant figures. **(2)**

**(c)** Evaluate the critic's claim that Treatment A doubles the chance of recovery. Use P(recovered | Treatment A) and P(recovered | No A). **(3)**

**(Total for Question 13 is 6 marks)**


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# Mark scheme · 3.20 Two Way Tables: Test Pack

## Question 1

4 cao **B1**

**Answer: 4**

## Question 2

use row total 14 - 8 or column total 16 - 10 **M1**

6 cao **A1**

**Answer: 6**

## Question 3

19 / 39 **M1**

x 100 **M1**

48.7% **A1**

**Answer: 48.7%**

## Question 4

49:28 found **M1**

divides by the common factor **M1**

7:4 **A1**

**Answer: 7:4**

## Question 5

(a) 100 cao **B1**

**(a) Answer: 100**

(b) 70/200 x 100 oe **M1**

(b) 35% cao **A1**

**(b) Answer: 35%**

(c) 70/100 oe **M1**

(c) 7/10 oe cao, awrt 0.7 **A1**

**(c) Answer: 7/10**

## Question 6

(a) correct table layout with rows Boys/Girls, columns Maths/English, and a Total row and column **B1**

(a) Boys English = 16 cao **B1**

(a) Girls Total = 22 cao **B1**

(a) Girls Maths = 4 cao **B1**

(a) column Totals correct: Maths = 16 and English = 34, cao **B1**

**(a) Answer: Boys: Maths 12, English 16, Total 28. Girls: Maths 4, English 18, Total 22. Column totals: Maths 16, English 34, Grand total 50.**

(b) 4 cao (ft their table) **B1**

**(b) Answer: 4**

(c) 16/50 oe (ft their Maths total) **M1**

(c) 8/25 oe cao **A1**

**(c) Answer: 8/25**

## Question 7

identify conditional probability: No bread and bought cake over total No bread = 15/30 **M1**

15/30 simplified to 1/2 cao **A1**

answer in lowest terms 1/2 cao **B1**

**Answer: 1/2**

## Question 8

boys hockey = 30 - 15 = 15 oe **M1**

football total = 15 + 9 = 24 and hockey total = 15 + 11 = 26 oe **M1**

entries: Boys hockey 15; Football total 24; Hockey total 26 cao **A1**

**Answer: Boys hockey = 15; Football total = 24; Hockey total = 26**

## Question 9

correct entry for Not Biology and Drama = 12 (or show 120 - 50 - (40 - 28) etc) or correct method **M1**

complete table with entries: Not Biology & Drama 12; Not Biology & Not Drama 58; Total Not Drama 80 cao **A1**

**Answer: Not Biology & Drama = 12; Not Biology & Not Drama = 58; Total Not Drama = 80; check totals 120.**

## Question 10

use formula P(A or B) = P(A) + P(B) - P(A and B) cso **M1**

substitute: 50/200 + 120/200 - 30/200 = (50 + 120 - 30)/200 = 140/200 cso **M1**

0.7 cao cso **A1**

**Answer: 0.7**

## Question 11

(a) Male smokes = 90 - 50 = 40; Male does not smoke = 140 - 40 = 100 cao **B1**

**(a) Answer: Male smokes = 40; Male does not smoke = 100**

(b) compute P(smokes and female) = 50/300 = 1/6 oe **M1**

(b) compute P(smokes) * P(female) = (90/300)*(160/300) = 48/300 oe **M1**

(b) because 50/300 is not equal to 48/300 conclude not independent, with reason given **C1**

**(b) Answer: Not independent, since P(smokes and female) = 50/300 whereas P(smokes)P(female) = 48/300, so they are not equal.**

## Question 12

use column totals: a = 110 - 54 = 56 or show method **M1**

a = 56 cao **A1**

use row total for Berry: b = 120 - a = 120 - 56 **M1**

b = 64 cao **A1**

**Answer: a = 56, b = 64**


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## Question 13

(a) c = 330 - 210 = 120 cao **B1**

**(a) Answer: 120**

(b) compute probability = 120 / 300 **M1**

(b) 0.400 to 3 s.f. cao **A1**

**(b) Answer: 0.400**

(c) compute P(recovered | Treatment A) = 210 / 300 = 0.70 **M1**

(c) compare ratio or factor: 0.70 / 0.40 = 1.75 or show doubling check **M1**

(c) conclude claim false with reason: treatment increases chance by factor 1.75 not 2 (70% vs 40%) **A1**

**(c) Answer: P(recovered | Treatment A) = 210/300 = 0.700. This is 0.700 / 0.400 = 1.75 times, not 2 times, so the claim is false; Treatment A increases recovery chance from 40% to 70%, a factor of 1.75.**


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