



Name: _____ Date: ____/____/____

1 A class of 30 pupils is asked if they prefer tea or coffee. The two-way table below shows the number of boys and girls who prefer each drink.

Total 14 16 30

(1)

- Total 18 32 50

(2)

- (2)

- 4** A two-way table shows results of 40 runners who wear either brand X or brand Y trainers and either sprint or run long distance.

Sprint Long distance Total

Brand X 10 6 16

Brand Y ? 14 24

Total 20 20 40

Find the number of Brand Y runners who sprint.

(2)

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- 5** From a survey of 120 shoppers, the following information was collected: 70 bought fruit, 50 bought vegetables, and 30 bought both fruit and vegetables.

Construct a two-way table showing counts for shoppers who bought fruit only, vegetables only and both, plus those who bought neither. Fill in the table and give the number who bought neither.

(3)

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- 6** A frequency tree shows whether pupils own a pet and, if so, whether it is a cat or dog. 60 pupils were asked. From the tree: 40 own a pet; of those 40, 25 own a dog and the rest own a cat.

Write down the number of pupils who own a cat and the probability that a randomly chosen pupil owns a dog.

(2)

- 7** Complete this frequency tree. 80 people take part. 48 like music. Of those who like music, 30 prefer pop and the rest prefer classical. Of those who do not like music, 12 prefer jazz.

Fill in the missing counts on the tree and write the number who prefer classical.

(2)

- 8** A frequency tree for 90 students gives: 54 take a language; of them 20 take Spanish and the rest take French. Of the students who do not take a language, 18 take Art. Calculate the probability that a randomly chosen student takes French and express your answer as a fraction in simplest form.

(3)

- 9** A two-way table shows hobbies of 200 pupils: 120 play sport, 90 do music, and 50 do both sport and music.

Complete the two-way table showing sport only, music only, both and neither. Then find the probability that a randomly chosen pupil does sport only.

(3)

- 10** A two-way table shows types of lunch and whether students eat in or take away. Every student is in exactly one of four categories. Of all students: 40% eat in and have a hot lunch, 25% take away and have a hot lunch, 20% eat in and have a cold lunch.

Complete: what percentage take away and have a cold lunch?

(2)

- 11** A table is partly damaged. From 150 shoppers, 90 bought shoes and 60 did not. Of those who bought shoes, 55 were adults. Complete the missing cell: how many children bought shoes?

(2)

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- 12** A two-way table shows 60 pupils: 36 are right-handed, 24 left-handed. 18 play a musical instrument; 12 of the instrument players are right-handed. Calculate the probability that a randomly chosen pupil is left-handed and does not play an instrument.

(3)

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- 13** A frequency tree shows outcomes for 200 customers: 120 choose product A, 80 choose product B. Of those who choose A, 50 choose the premium option; of those who choose B, 20 choose the premium option. Find how many customers choose the premium option and the probability that a randomly chosen customer chose B and the premium option.

(3)

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- 14** Compare these probabilities and give a reason. From a table of 100 pupils: 40 do drama, 30 do art, 15 do both.

Which is more likely: a pupil does drama but not art, or a pupil does art (including those who also do drama)? Give the probabilities and a sentence explaining why one is larger.

(2)

- 15** A survey of 150 people gives this information: 90 like tea, 60 like coffee. Of the tea-likers, 30 also like coffee. Draw a frequency tree showing tea/coffee choices and find how many people like coffee only.

(3)

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- 16** Stretch: A two-way table for 180 students shows whether they study languages and whether they play a sport. 110 study a language, 85 play a sport. 50 study a language and play a sport. How many students study a language but do not play a sport? Also give the probability that a randomly chosen student studies a language but does not play a sport.

(4)

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- 17** Stretch: A frequency tree for 360 customers first splits by membership: 75% are members, 25% non-members. Of members, 40% buy product P; of non-members, 10% buy product P. Use the tree to find how many customers buy product P, and then find the probability that a randomly chosen customer is a member who bought P.

(4)

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- 18** Stretch: From a two-way table of 240 pupils, 150 play an instrument, 120 do sport. If 80 do both instrument and sport, what is the probability that a pupil chosen at random plays an instrument given that they do sport? Give your answer as a fraction in simplest form.

(3)

Mark scheme · KS3.M-P5 Two-Way Tables and Frequency Trees

Question 1

- **B1** 6 cao
- Answer: **6**

Question 2

- **M1** use total for countryside: $20 - 6 = 14$ or use column total $32 - 18 = 14$
- **A1** 14 cao
- Answer: **14**

Question 3

- **M1** uses 16 out of 30 or equivalent method
- **A1** 8/15 cao
- Answer: **8/15**

Question 4

- **M1** use row total: $24 - 14 = 10$ (consistent with column total $20 - 10 = 10$)
- **A1** 10 cao
- Answer: **10**

Question 5

- **M1** calculate fruit only = $70 - 30 = 40$ or vegetables only = $50 - 30 = 20$
- **M1** use totals: neither = $120 - (\text{fruit only} + \text{veg only} + \text{both}) = 120 - (40 + 20 + 30) = 30$
- **A1** table completed correctly and neither = 30 cao
- Answer: **Fruit only 40, Vegetables only 20, Both 30, Neither 30**

Question 6

- **B1** cat owners = $40 - 25 = 15$ cao
- **B1** probability dog = $25/60 = 5/12$ cao
- Answer: **15; 5/12**

Question 7

- **M1** complete music branch: classical = $48 - 30 = 18$; non-music total = $80 - 48 = 32$
- **A1** classical = 18 and non-music total = 32 cao
- Answer: **Classical 18; Non-music total 32**

Question 8

- **M1** find French = $54 - 20 = 34$
- **M1** use total 90 to form probability $34/90$
- **A1** 17/45 cao
- Answer: **17/45**

Question 9

- **M1** compute sport only = $120 - 50 = 70$ and music only = $90 - 50 = 40$
- **M1** neither = $200 - (70 + 40 + 50) = 40$
- **A1** probability sport only = $70/200 = 7/20$ cao
- Answer: **Sport only 70, Music only 40, Both 50, Neither 40; probability 7/20**

Question 10

- **M1** method: $100 - (40 + 25 + 20)$
- **A1** 15% cao
- Answer: **15%**

Question 11

- **M1** children who bought shoes = total bought shoes - adults who bought shoes = $90 - 55 = 35$
- **A1** 35 cao
- **Answer: 35**

Question 12

- **M1** find left-handed instrument players: total instrument 18, right-handed instrument 12 so left-handed instrument = 6
- **M1** left-handed total = 24 so left-handed who do not play instrument = $24 - 6 = 18$
- **A1** probability = $18/60 = 3/10$ cao
- **Answer: 3/10**

Question 13

- **M1** premium total = $50 + 20 = 70$
- **M1** customers B premium = 20 and form probability $20/200$
- **A1** probability = $1/10$ cao
- **Answer: Premium total 70; probability 1/10**

Question 14

- **M1** correct probabilities: drama but not art = $40 - 15 = 25$ so $25/100 = 1/4$; art overall = $30/100 = 3/10$
- **A1** explain $1/4 = 0.25 > 0.3$? actually $1/4 = 0.25$, $3/10 = 0.3$ so art is more likely; explanation given correctly
- **Answer: Drama not art 1/4; Art 3/10. Art is more likely because 30% do art while only 25% do drama without art.**

Question 15

- **M1** use both = 30 and coffee total 60 to get coffee only = $60 - 30 = 30$
- **M1** use tea only = $90 - 30 = 60$ and neither = $150 - (\text{tea only} + \text{coffee only} + \text{both}) = 150 - (60 + 30 + 30) = 30$
- **A1** coffee only = 30 and tree labelled correctly cao
- **Answer: Coffee only 30**

Question 16

- **M1** language only = $110 - 50 = 60$
- **M1** form probability = $60/180$
- **M1** simplify probability to $1/3$
- **A1** language only 60 and probability $1/3$ cao
- **Answer: 60; 1/3**

Question 17

- **M1** members count = $0.75 * 360 = 270$, non-members = 90
- **M1** members buying $P = 0.40 * 270 = 108$; non-members buying $P = 0.10 * 90 = 9$
- **M1** total buying $P = 108 + 9 = 117$
- **A1** probability member and $P = 108/360 = 3/10$ cao
- **Answer: 117; 3/10**

Question 18

- **M1** conditional probability method: $P(\text{instrument and sport})/P(\text{sport}) = 80/120$
- **A1** reduce fraction to $2/3$
- **A1** final answer $2/3$ cao
- **Answer: 2/3**