OCR
Oxford Cambridge and RSA

F

Thursday 7 November 2019 – Morning

GCSE (9–1) Mathematics

J560/02 Paper 2 (Foundation Tier)

Time allowed: 1 hour 30 minutes

You may use:
- geometrical instruments
- tracing paper

Do not use:
- a calculator

Please write clearly in black ink. **Do not write in the barcodes.**

Centre number | | | | | | Candidate number | | | | |

First name(s) _____

Last name _____

INSTRUCTIONS
- Use black ink. You may use an HB pencil for graphs and diagrams.
- Answer **all** the questions.
- Read each question carefully before you start to write your answer.
- Where appropriate, your answers should be supported with working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided.
- Additional paper may be used if required but you must clearly show your candidate number, centre number and question number(s).

INFORMATION
- The total mark for this paper is **100**.
- The marks for each question are shown in brackets **[ ]**.
- This document consists of **20** pages.

No calculator can be used for this paper

MathsMadeEasy.co.uk Solutions

© OCR 2019 [601/4606/0]
DC (NF/CB) 180901/6

OCR is an exempt Charity

Answer **all** the questions.

1 Work out.

(a) $89 + 14$

$$\begin{array}{r} {}^{1}89 \\ +\ 14 \\ \hline 103 \end{array}$$

(a) ..... 103 ..... **[1]**

(b) 17×21

$$\begin{array}{r} {}^{1}17 \\ \times\ 21 \\ \hline 17 \\ +\ 340 \\ \hline 357 \end{array}$$

(b) ..... 357 ..... **[2]**

2 The table shows some temperatures, in °C.

Monday	Tuesday	Wednesday	Thursday	Friday
-5	-1	5	6	-3

(a) Find the difference between the temperatures on Thursday and Friday.

$6 - -3 = 6 + 3 = 9$

(a) ..... 9 ..... °C **[1]**

(b) On Saturday the temperature was 7 °C higher than on Friday.

Find the temperature on Saturday.

$-3 + 7 = 7 - 3$

$= 4$

(b) ..... 4 ..... °C **[1]**

© OCR 2019

Mathvault.io Solutions

3 Complete each statement by writing the missing value in the box.

(a) $\frac{2}{5} = \frac{4}{\boxed{10}}$ (×2 on top, ×2 on bottom) **[1]**

(b) $2\frac{1}{3} = \frac{\boxed{7}}{3}$ $2 \times 3 + 1 = 7$ **[1]**

(c) $7 \times 7 \times 7 \times 7 \times 7 = 7^{\boxed{5}}$ **[1]**

4 Work out.

(a) $\frac{5}{6}$ of 18 kg

18 kg ÷ 6 = 3 kg

5 × 3 kg = 15 kg

(a) ..... 15 ..... kg **[2]**

(b) £5 – £1.49

$$\begin{array}{r} {}^{4}\not{5}.{}^{9}\not{0}{}^{1}0 \\ -\ 1.49 \\ \hline 3.51 \end{array}$$

(b) £ ..... 3.51 ..... **[1]**

(c) 0.15 ÷ 5

$$5\overline{)\,0.1^{1}5} \quad 0.03$$

(c) ..... 0.03 ..... **[1]**

© OCR 2019

Mathvault.io Solutions

5 **(a)** Write 0.3 as a fraction.

↑ tenths

$\frac{3}{10}$

(a) $\frac{3}{10}$ **[1]**

(b) Write $\frac{1}{4}$ as a decimal.

$$4\overline{)1.^{1}0^{2}0} = 0.25$$

(b) 0.25 **[1]**

6 Write the following in order of size, smallest first.

5.9 0.61 5.977 5.099 5.98

↑ 1s

5.900 ③
5.977 ④
5.099 ②
5.980 ⑤

0.61 5.099 5.9 5.977 5.98 **[2]**

smallest

Mathvault.io Solutions

© OCR 2019

7 Work out the following, giving each answer as a fraction.

(a) $1\frac{3}{4}+\frac{1}{2}$

$\frac{3}{4}+\frac{1}{2}$ ×2 ×2

$\frac{3}{4}+\frac{2}{4}=\frac{5}{4}$

$=1\frac{1}{4}$

$1+1\frac{1}{4}=2\frac{1}{4}$

(a) $2\frac{1}{4}$ ..... [1]

(b) $\frac{3}{8}\div 2$

K C F

$\frac{3}{8}\div\frac{2}{1}$

$\frac{3}{8}\times\frac{1}{2}=\frac{3}{16}$

(b) $\frac{3}{16}$ ..... [1]

(c) $\frac{1}{3}\times\frac{1}{2}$

$=\frac{1}{6}$

(c) $\frac{1}{6}$ ..... [1]

Mathvault.io Solutions

© OCR 2019

8 Hannah saves an amount of money each week.
Here are the amounts, in pounds, that she saved in the first 5 weeks of 2019.

13 58 11 22 11

(a) Find

(i) the median of the five amounts,

11 11 13 22 58

(a)(i) £ 13 **[2]**

(ii) the range of the five amounts.

58 − 11 = 47

(ii) £ 47 **[2]**

(b) In the 6th week, she also saved some money. x
The mean amount that Hannah saved each week over the 6 weeks was £22.

How much did she save in the 6th week?

$$\frac{11 + 11 + 13 + 22 + 58 + x}{6} = 22$$

11 + 11 = 22

22 + 13 = 35

35 + 22 = 57

57 + 58 = 115

$$\frac{115 + x}{6} = 22$$

×6 ×6

115 + x = 132

−115 −115

x = 17

1 22
× 6
132

2 1 1
1 3 2
− 1 1 5
0 1 7

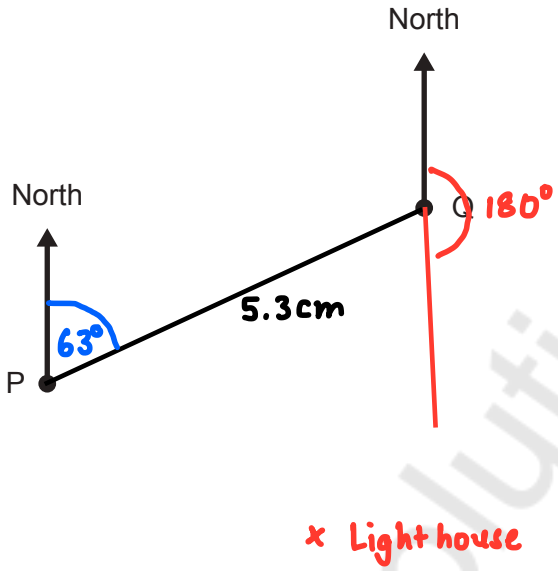
(b) £ 17 **[3]**

© OCR 2019

Mathvault.io Solutions

9 The scale drawing shows the positions of two boats, P and Q.

Scale: 1 cm represents 4 km



(a) Find the actual distance between boat P and boat Q.

1cm = 4km
×4

$$\begin{array}{r} 5.3 \\ \times\ 4 \\ \hline 21.2 \end{array}$$

(a) ..... 21.2 km **[2]**

(b) Measure the bearing of boat Q from boat P.

(b) ..... 063 ° **[1]**

(c) A lighthouse is

- 18 km from boat P
- on a bearing of 200° from boat Q.

1cm = 4km
÷4

$$4\overline{)18.20} = 4.5$$

4.5cm

On the scale drawing, mark a possible position of the lighthouse with a cross. **[2]**

Mathvault.io Solutions

© OCR 2019

10 A man running at a constant speed of 5 metres per second takes 66 seconds to complete a particular distance.
A horse completes the same distance running at a constant speed of 15 metres per second.

Find the difference, in seconds, in the times taken by the man and by the horse to run this distance.

D
S T

Man

S = 5 m/s

T = 66s

D = S x T

= 5 x 66

= 330m

Horse

S = 15 m/s

D = 330m

$T = \frac{D}{S} = \frac{330}{15} \div 5 \div 5$

$= \frac{66}{3}$

= 22 seconds

66 − 22 = 44

..... 44 ..... seconds **[3]**

11 **(a)** Alice buys a picture for £180 and later sells it for £216.

Find the percentage profit that she made.

Profit

$\begin{array}{r} {}^{1}\cancel{2}{}^{1}16 \\ -\,180 \\ \hline 036 \end{array}$ £36

% profit $\frac{36 \div 9}{180 \div 9} \times 100$

$\frac{4}{20} \times 100$

$\frac{400}{20} = 20$

(a) ..... 20 ..... % **[3]**

(b) Rashid wants to increase £345 by 17% in one step by using a decimal multiplier.

↳ 100 + 17 = 117 ⟶ 1.17

Write the decimal multiplier to complete Rashid's calculation.

345 × ..... 1.17 .....

[1]

© OCR 2019

Mathvault.io Solutions

12 In an exam, Adam scored the following marks.

Paper 1	17 out of 20
Paper 2	19 out of 25

(a) Show that he scored a higher percentage in Paper 1 than Paper 2. **[2]**

Paper 1 $\frac{17}{20} \overset{\times 5}{=} \frac{85}{100} = 85\%$

Paper 2 $\frac{19}{25} \overset{\times 4}{=} \frac{76}{100} = 76\%$

$85\% > 76\%$

(b) The two marks are added together.

Work out Adam's overall percentage for the two papers.

$17 + 19 = 36$

$20 + 25 = 45$

$\frac{36}{45} \overset{\div 9}{\underset{\div 9}{}} \times 100$

$\frac{4}{5} \times 100$

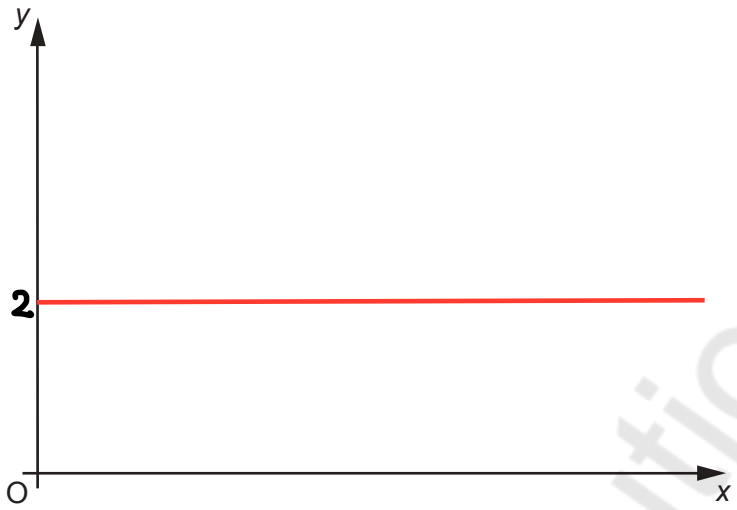
$\frac{400}{5} = 80$

(b) ..... 80 ..... % **[3]**

© OCR 2019

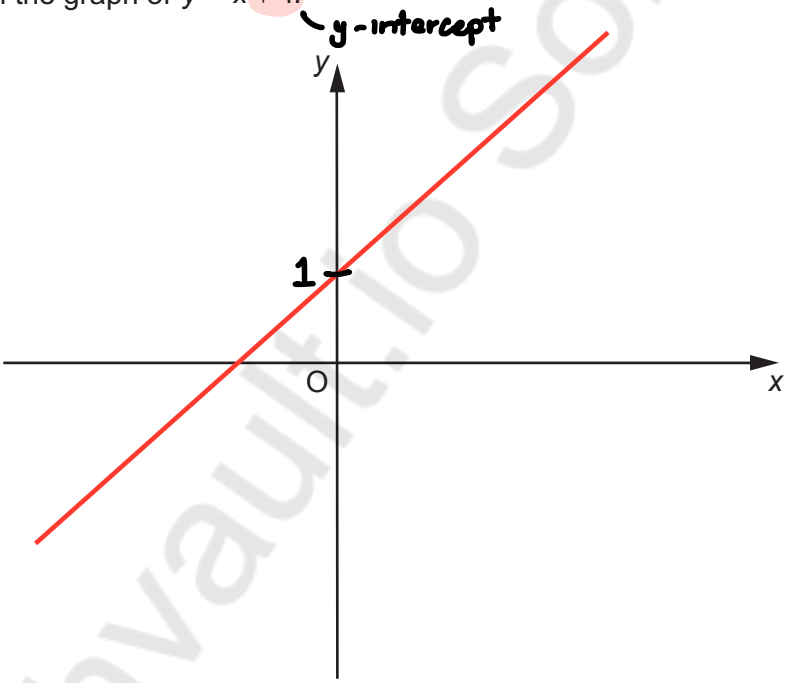
Mathvault.io Solutions

13 (a) (i) Sketch the graph of $y = 2$.



[2]

(ii) Sketch the graph of $y = x + 1$.



[2]

(iii) Ceri says that the graphs of $y = 2$ and $y = x + 1$ cross at the point (2, 3).

Explain the error in her answer.

$2 = x + 1$ $\quad 1 = x \quad (1, 2)$

$-1 \quad -1$

They cross at (1,2) not (2,3).

.....

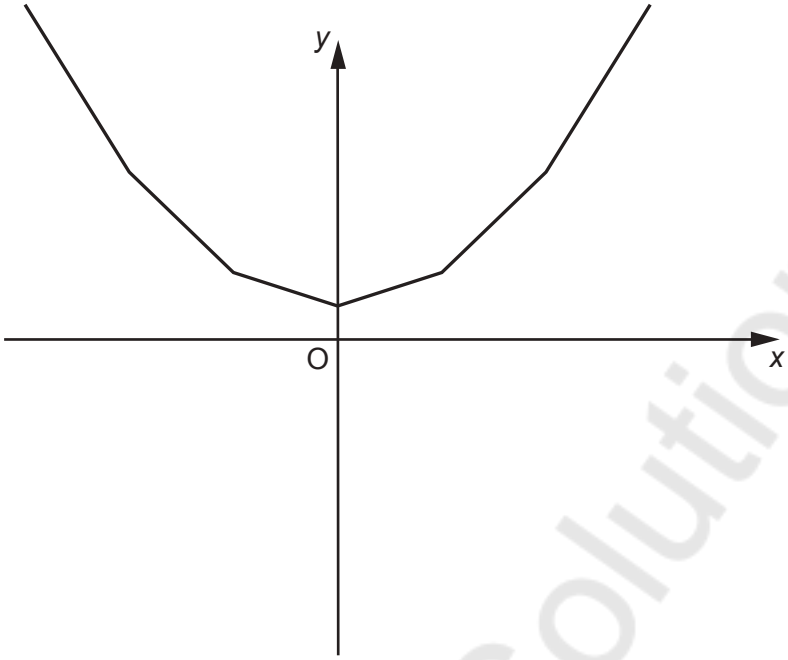
.....

[1]

© OCR 2019

Mathvault.io Solutions

(b) Oliver has sketched the graph of $y = x^2$ below.



Make two comments about the accuracy of his sketch.

1 Should be a curve.

2 Should go through (0,0).

[2]

Mathvault.io Solutions

© OCR 2019

14 **(a)** Write each of the following ratios in their simplest form.

(i) 8 : 10

÷2 ÷2

4 : 5

(a)(i) ..... 4 : 5 ..... **[1]**

(ii) 300 ml : 2.1 litres

×1000

300 : 2100 ml

÷300 ÷300

1 : 7

(ii) ..... 1 : 7 ..... **[3]**

(b) The ratio $\sin 30° : \tan 45°$ can be written in the form $1 : n$.

Find the value of n.

$\sin 30° = \frac{1}{2} = 0.5$

$\tan 45° = 1$

0.5 : 1

×2 ×2

1 : 2

↑

n

(b) $n =$ ..... 2 ..... **[3]**

© OCR 2019

Mathvault.io Solutions

15 Angie is planning a presentation evening.
She writes down her costs and income.

Costs	Income
10 staff each working 6 hours at £8 per hour Food: 60 meals at £8.95 each ≈ £9 Prizes: 12 prizes at £19.99 each ≈ £20	60 guests each paying £5 Sponsorship £1000

Angie thinks she will make a small profit.

Use estimation to decide if Angie is correct.
Show all of your working.

Costs

Staff = 10 × 6 × 8
= £480

Food = 60 × £9
= £540

Prizes = 12 × £20
= £240

Total = $^{1}480 + 540 + 240 = £1260$

Income

Guests = 60 × £5
= £300

Total = 1000 + 300 = £1300

Profit = 1300 − 1260
= 40

Yes. £40 profit. ..... **[6]**

© OCR 2019

MathVault.io Solutions

16 Martina has answered some questions on algebra.
In each question, she has made an error.

Describe her error and give the correct answer to each problem.

(a) Question 1 Simplify. $2a \times a \times a$

Martina's answer $4a$

Martina's error is She added the terms

Correct answer = $2a^3$ **[2]**

(b) Question 2 Simplify. $\frac{x^{10}}{x^2}$

Martina's answer x^5

Martina's error is She divided the powers

Correct answer = x^8 **[2]**

(c) Question 3 $s = ut + \frac{1}{2}at^2$

Find s when $u = 0$, $t = 5$ and $a = 6$.

Martina's solution $s = 0 \times 5 + \frac{1}{2} \times 6 \times 5^2$ ✓

$s = 0 + 15^2$ ✓

$s = 225$

$\frac{1}{2} \times 6 = 3$

$3 \times 5^2 = 3 \times 25$
$= 75$

Martina's error is She squared $(\frac{1}{2} \times 6 \times 5)$

Correct answer = 75 **[2]**

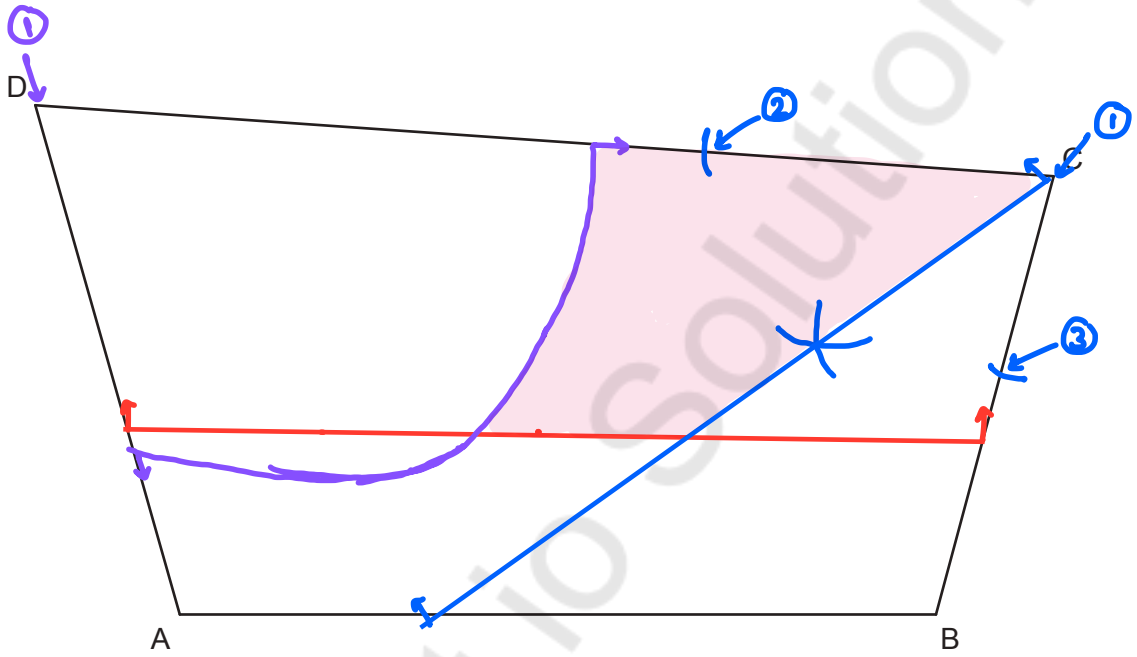
© OCR 2019

Mathvault.io Solutions

17 The diagram shows the scale drawing of a garden ABCD.

Scale: 1 cm represents 5 m

÷5



A tree is to be planted in the garden so that it is

- at least 10 m from AB

10 ÷ 5 = 2cm

and

- closer to CD than CB

angle bisector

and

- at least 15 m from D.

15 ÷ 2 = 7.5cm

Using a ruler and compasses only, construct and shade the region in which the tree can be planted.

[6]

© OCR 2019

Mathvault.io Solutions

18 Solve by factorising.

$x^2 + 9x + 20 = 0$

4 × 5 = 20

4 + 5 = 9

$(x + 4)(x + 5) = 0$

$x + 4 = 0$ $\quad$ $x + 5 = 0$

$-4 \quad -4$ $\quad$ $-5 \quad -5$

$x = -4$ $\quad$ $x = -5$

$x =$ −4 or $x =$ −5 **[3]**

Mathvault.io Solutions

© OCR 2019

19 On a plane, $\frac{2}{5}$ of the passengers were British.

30% of the British passengers were men.
There were 36 British men on the plane.

Find the total number of passengers on the plane.

$\frac{2}{5}$ British

30% = 36

÷3 ÷3

10% = 12

×10 ×10

100% = 120 British passengers

$\frac{2}{5}$ = 120

÷2 ÷2

$\frac{1}{5}$ = 60

×5 ×5

$\frac{5}{5}$ = 300 total

300 **[5]**

20 A bag contains 100 pencils that are either red or green.

Describe a method you could use to estimate the number of red pencils in the bag without looking into the bag or having more than one of the pencils out of the bag at any one time.

Select a pencil from the bag, record the result / colour and put it back in the bag.

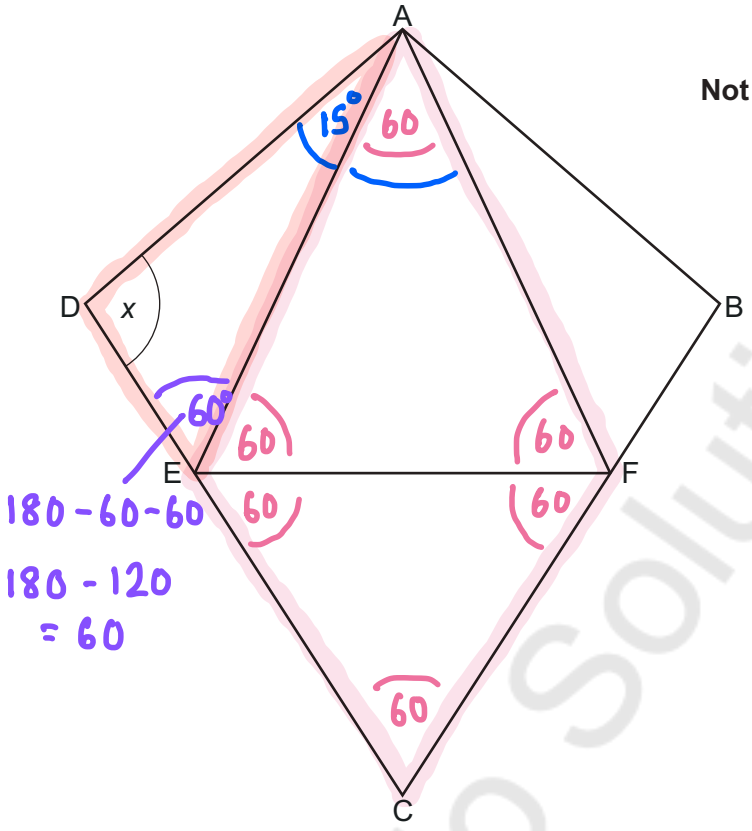
Repeat trial at least 10 times

Find relative frequency of red pencil, then x 100. **[4]**

© OCR 2019

Mathvault.io Solutions

21 The diagram shows a kite, ABCD.
AFE and CEF are equilateral triangles.



Not to scale

(a) Write down a mathematical name for quadrilateral AFCE.

(a) ..... Rhombus ..... **[1]**

(b) The ratio of angle DAE : angle EAF = 1 : 4.

Work out angle *x*.
Write on the diagram the values of any other angles you use in your working.

DAE : EAF
1 : 4
×15 ×15
15 : 60

180 - 60 - 15
180 - 75
= 105°

(b) $x =$ 105 ° **[4]**

MathVault.io Solutions

© OCR 2019

100 - 20 = 80

59 - x + x + 62 - x = 80

121 - x = 80

+x +x

121 = 80 + x

-80 -80

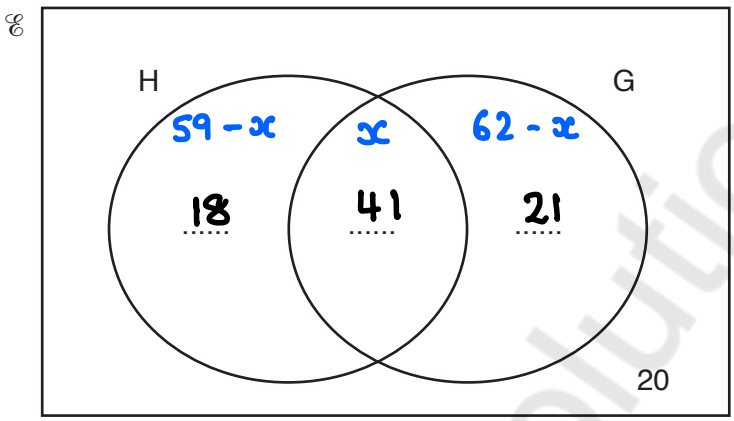
41 = x

159
62
121

22 In a group of 100 students

- 59 study History (H)
- 62 study Geography (G)
- 20 do not study either subject.

(a) Complete the Venn diagram.



[3]

(b) One of the 100 students is selected at random.

Find the probability that this student studies exactly one of the two subjects.

H = 18 or G = 21

18 + 21 = 39

39
100

(b) ..... **[2]**

Mathvault.ie Solutions

Turn over for Question 23

© OCR 2019

23 A straight line with gradient 4 passes through the point (1, 5).

Find the equation of the line in the form $y = mx + c$.

x y

↑ gradient = 4

$5 = 4(1) + c$

$5 = 4 + c$

$-4 \quad -4$

$1 = c$

$y = 4x + 1$

.....$y = 4x + 1$..... **[3]**

END OF QUESTION PAPER

Mathvault.io Solutions

OCR
Oxford Cambridge and RSA

Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact The OCR Copyright Team, The Triangle Building, Shaftesbury Road, Cambridge CB2 8EA.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

© OCR 2019