

Thursday 7 November 2019 – Morning

GCSE (9–1) Mathematics

J560/02 Paper 2 (Foundation Tier)

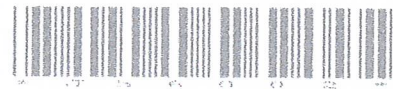
Time allowed: 1 hour 30 minutes

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

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Candidate number

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First name(s)

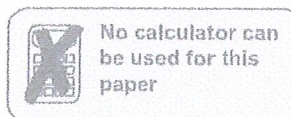
Last name

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.



Answer **all** the questions.

1 Work out.

(a) $89 + 14$

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

(b) 17×21

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

2 The table shows some temperatures, in $^{\circ}\text{C}$.

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

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

(a)9..... $^{\circ}\text{C}$ [1]

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

Find the temperature on Saturday.

(b)4..... $^{\circ}\text{C}$ [1]

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

(a) $\frac{2}{5} = \frac{4}{\boxed{10}}$ [1]

(b) $2\frac{1}{3} = \frac{\boxed{7}}{3}$ [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 $\frac{5}{6} \times 18$

(a) 15 kg [2]

(b) £5 - £1.49

$$\begin{array}{r} 4 \quad 5.00 \\ - 1.49 \\ \hline 3.51 \end{array}$$

(b) £ 3.51 [1]

(c) $0.15 \div 5$

$$15 \div 5 = 3$$

$$0.15 \div 5 = 0.03$$

(c) 0.03 [1]

Turn over

5 (a) Write 0.3 as a fraction.

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

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

(b) 0.25 [1]

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

5.9 0.61 5.977 5.099 5.98

$\frac{0.61}{\text{smallest}}$ $\frac{5.099}{\text{.....}}$ $\frac{5.9}{\text{.....}}$ $\frac{5.977}{\text{.....}}$ $\frac{5.98}{\text{.....}}$ [2]

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

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

$$\frac{7}{4} + \frac{1}{2} \rightarrow \frac{7}{4} + \frac{2}{4} = \frac{9}{4} = 2\frac{1}{4}$$

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

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

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

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

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

- 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.
The mean amount that Hannah saved each week over the 6 weeks was £22.

How much did she save in the 6th week?

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

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

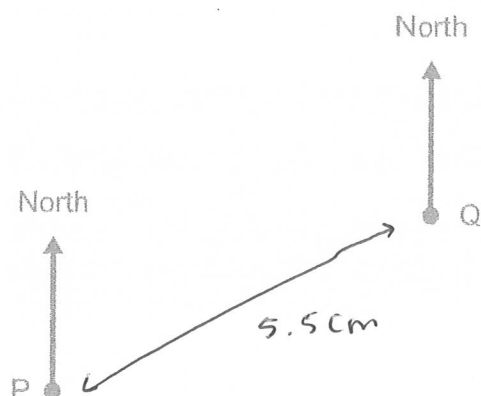
$$115 + x = 132$$

$$x = 17$$

(b) £ 17 [3]

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.

(a) 2.2 km [2]

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

(b) 0.65 ° [1]

(c) A lighthouse is

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

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

- 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.



$$\begin{aligned} D &= S \times T \\ &= 5 \times 66 \\ &= 330 \text{ m} \end{aligned}$$

$$T = \frac{D}{S} = \frac{330}{15} = 22 \text{ seconds}$$

$$66 - 22 = 44 \text{ seconds}$$

..... 44 seconds [3]

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

Find the percentage profit that she made.

$$\frac{216 - 180}{180} \times 100$$

$$\frac{36}{180} \times 100$$

$$\frac{1}{5} \times 100$$

(a) 20 % [3]

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

Write the decimal multiplier to complete Rashid's calculation.

$$345 \times \dots 1.17 \dots$$

[1]

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]

$$\frac{17}{20} \xrightarrow{\times 5} \frac{85}{100} \quad 85\%$$

$$\frac{19}{25} \xrightarrow{\times 4} \frac{76}{100} \quad 76\%$$

(b) The two marks are added together.

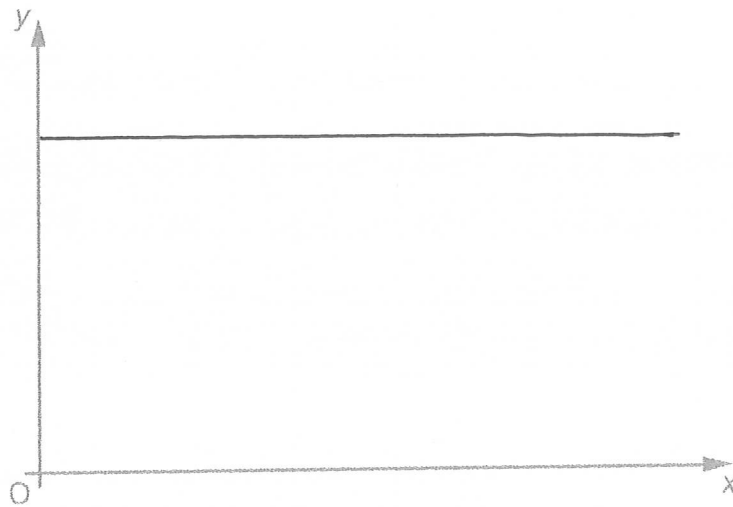
Work out Adam's overall percentage for the two papers.

$$\frac{17+19}{20+25} = \frac{36}{45} \xrightarrow{\div 3} \frac{12}{15} \xrightarrow{\div 3} \frac{4}{5}$$

$$\frac{4}{5} \times 100 = 80$$

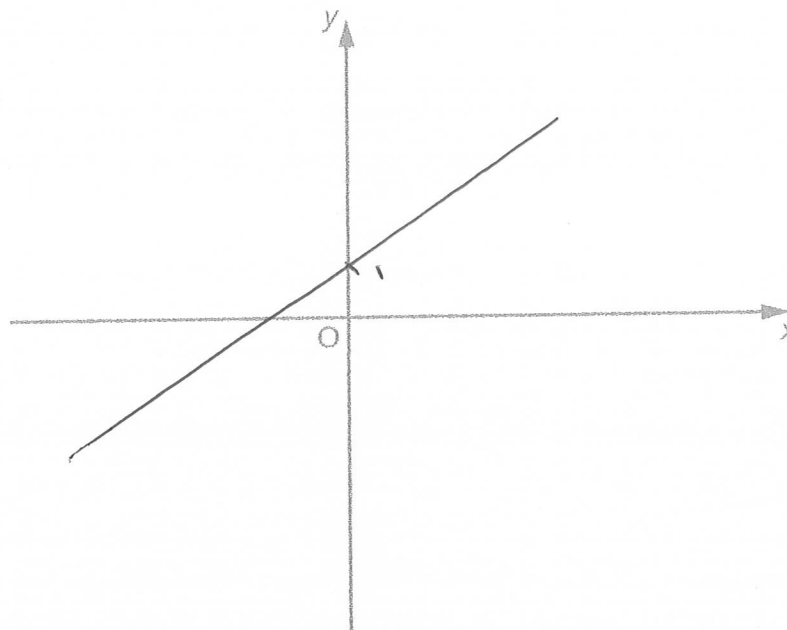
(b) 80 % [3]

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



[2]

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



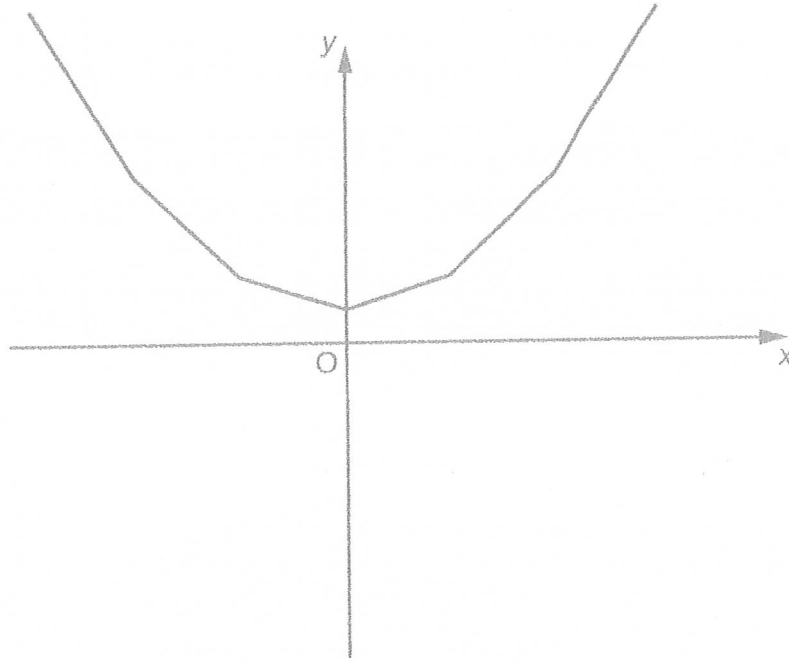
[2]

- (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.

the y value of the intersection must be 2
 so $(1, 2)$ is the coordinate [1]

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



Make two comments about the accuracy of his sketch.

- 1 ... curve should go through $(0,0)$
- 2 ... should be a smooth curve

[2]

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

(i) 8 : 10

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

(ii) 300 ml : 2.1 litres

0.3 : 2.1

0.1 : 0.7

1 : 7

(ii) 1 : 7 [3]

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

Find the value of n .

0.5 : 1

1 : 2

(b) $n =$ 2 [3]

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

Costs
10 staff each working 6 hours at £8 per hour
Food: 60 meals at £8.95 each.
Prizes: 12 prizes at £19.99 each

Income
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.

staff costs

$$10 \times 6 \times 8 = 480$$

food costs

$$60 \times 8.95 = \text{round } 537$$

prize costs

$$12 \times 19.99 = 239.88$$

- 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 ...adding the terms instead of multiplying

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

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

Martina's answer x^5

Martina's error is ...dividing the powers instead of subtracting

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 $s = 0 \times 5 + \frac{1}{2} \times 6 \times 5^2$

$$s = 0 + 15^2$$

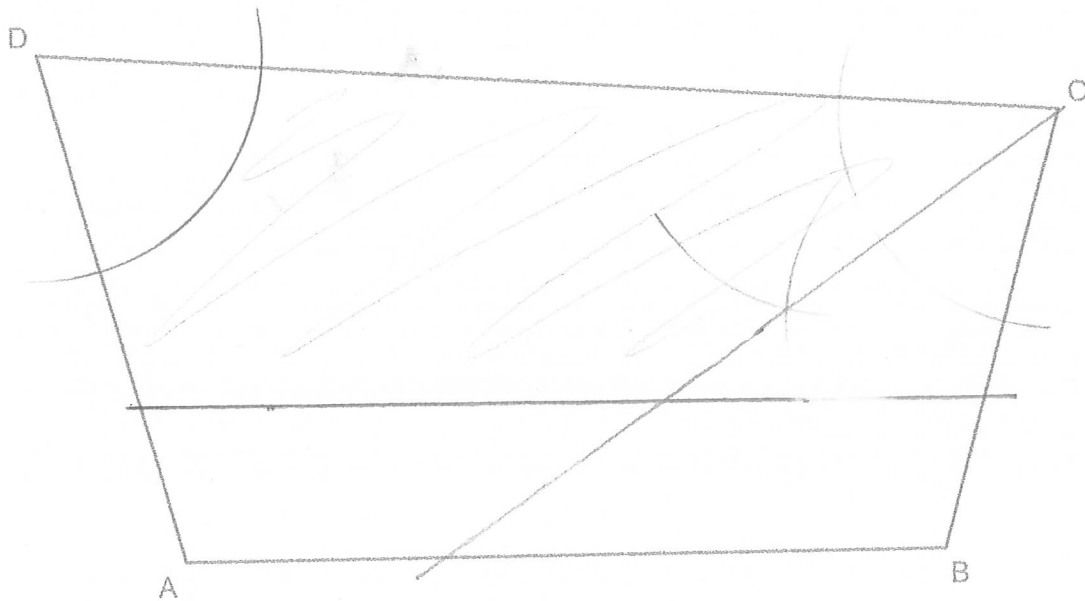
$$s = 225$$

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

Correct answer = 7.5 [2]

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

Scale: 1 cm represents 5 m



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

- at least $\overset{2\text{cm}}{\nearrow}$ 10 m from AB
- and
- closer to CD than CB
- and
- at least $\overset{3\text{cm}}{\nearrow}$ 15 m from D.

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

[6]

Turn over

18 Solve by factorising.

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

16

$$5 \times 4 = 20$$

$$5 + 4 = 9$$

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

$$x = \dots -5 \dots \text{ or } x = \dots -4 \dots [3]$$

- 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.

$$30\% \times \frac{2}{5} \rightarrow 0.3 \times 0.4 = 0.12$$

$$36 \div 0.12 = 300$$

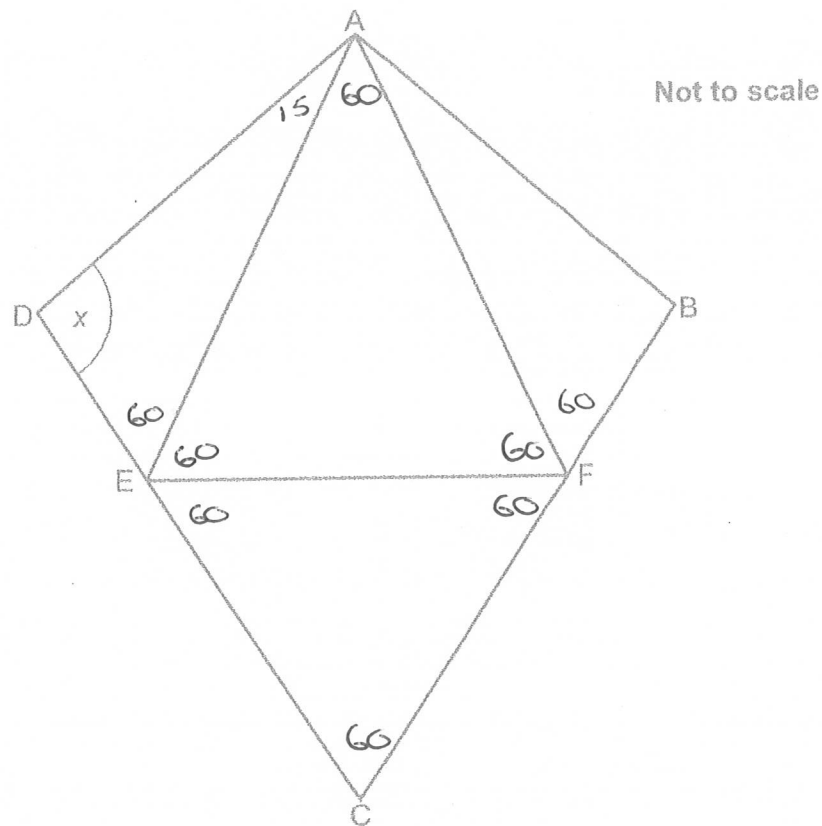
.....300..... [5]

- 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 and record the
...results, put the pencil back in the bag.
...Repeat at least 10 times, then find the
...relative frequency and multiply this by 100

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



- (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.

$\angle DEA = 60$ as angle on a straight line
 $\angle AFB = 60$ add to 180° and equilateral triangle properties

$$60 \div 4 = 15 \quad \text{so} \quad \angle DAE = 15$$

$$180 - 60 - 15 = 105 \quad \text{(b)} \quad x = \dots\dots\dots 105 \dots\dots\dots^\circ \quad [4]$$

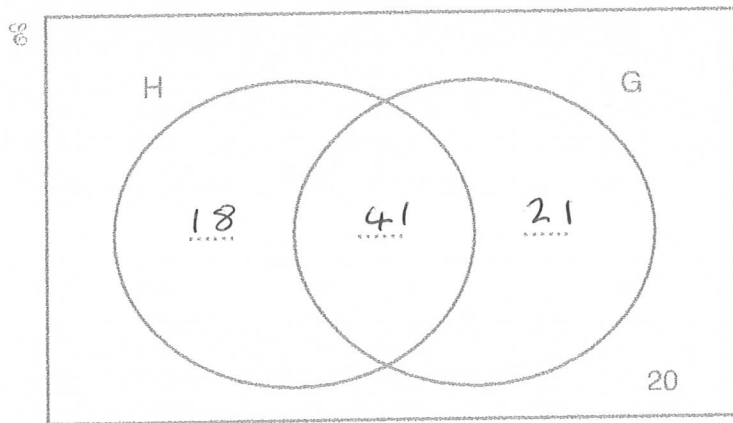
22 In a group of 100 students

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

(a) Complete the Venn diagram.

$$59 + 62 = 121$$

$$121 - 80 = 41$$



[3]

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

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

$$\frac{18 + 21}{100}$$

(b) $\frac{39}{100}$ [2]

Turn over for Question 23

$$\rightarrow x = 1, y = 5$$

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

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

$$y = 4x + c$$

$$5 = 4 \times 1 + c$$

$$c = 1$$

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

END OF QUESTION PAPER

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