OCR
Oxford Cambridge and RSA

H

GCSE (9–1) Mathematics

J560/04 Paper 4 (Higher Tier)

Practice Paper – Set 3

Time allowed: 1 hour 30 minutes

2016

You may use:
- A scientific or graphical calculator
- Geometrical instruments
- Tracing paper

J560/04

First name									
Last name									
Centre number						Candidate number				

INSTRUCTIONS
- Use black ink. You may use an HB pencil for graphs and diagrams.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Read each question carefully before you start 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).
- Do **not** write in the barcodes.

INFORMATION
- The total mark for this paper is **100**.
- The marks for each question are shown in brackets **[ ]**.
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
- This document consists of **20** pages.

Answer **all** the questions.

1 Between January 2015 and January 2016 the price of diesel increased from £1.12 per litre to £1.19 per litre.

Calculate the percentage increase in price.

..... % **[3]**

2 **(a)** Write the ratio 6 mm : 180 cm in the form 1 : *n*.

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

(b) An athlete runs 240 metres in 45 seconds.

Work out her average speed in kilometres per hour.

(b) ..... km/h **[3]**

3 **(a)** Write down the equation of a line parallel to $y = 5x + 3$ that passes through the point $(0, -7)$.

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

(b) Find the equation of the line through the points $(-3, -17)$ and $(0, 1)$.

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

4 Solve.

$$3(6x - 5) = 48$$

$x =$ ..... **[3]**

5 An alloy is made from 28 cm^3 of copper and 41 cm^3 of gold.

The density of copper is 9 g/cm^3.
The density of gold is 19 g/cm^3.

(a) Work out the mass of copper used.

(a) ..... g **[2]**

(b) Work out the density of the alloy.

(b) ..... g/cm^3 **[4]**

6 Hannah's race time, *t* seconds, was recorded as 53.48, correct to 2 decimal places.

Complete the error interval for Hannah's race time.

..... $\leqslant t <$ ..... **[2]**

7 **(a)** Here are the first five terms of two sequences.

Write down the next term in each of these sequences.

(i) 1 1 2 3 5

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

(ii) 5 8 13 20 29

(ii) ..... **[1]**

(b) The nth term of a sequence is given by $n^2 - 3n$.

Write down the second and fifth terms of the sequence.

(b) second term = ...

fifth term = ... **[2]**

8 A railway station has two platforms.
Trains stop at the northbound platform every 15 minutes.
Trains stop at the southbound platform every 18 minutes.

Two trains stopped together at 15 12.

(a) Work out the next time two trains stop together at this station.

(a) ..... **[4]**

(b) Write down two assumptions that were necessary to solve this problem.

1 .....

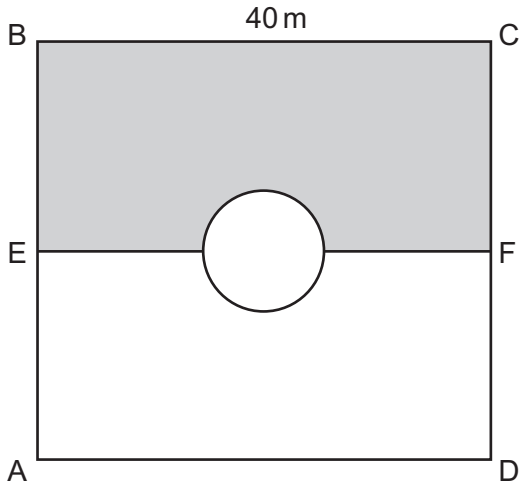
.....

2 .....

.....

[2]

9 The diagram shows all the paths in a park.
ABCD is a square of side 40 metres.
E is the midpoint of AB. F is the midpoint of CD.
The circular path is in the centre of the square and has radius 5 metres.



Not to scale

(a) Work out the percentage of the square ABCD that is shaded.

(a) ..... % **[6]**

(b) Work out the shortest distance from E to F across the park, using only the paths shown.

(b) ..... m **[4]**

10 In a class of 34 students

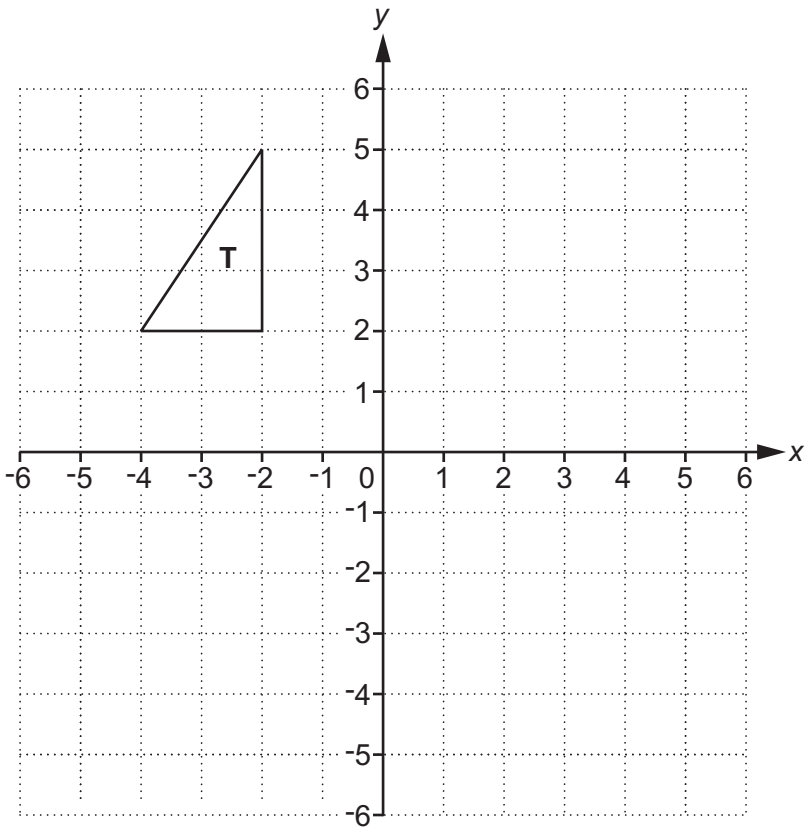
- 12 study German
- 25 study Spanish
- 6 do not study either language.

One student in the class is selected at random.

Find the probability that this student studies **both** languages.

..... **[4]**

11 A triangle **T** is drawn on a coordinate grid.



(a) Translate triangle **T** by the vector $\begin{pmatrix} -2 \\ -5 \end{pmatrix}$.

Label your answer **V**. **[2]**

(b) Describe fully the **single** transformation that is equivalent to:

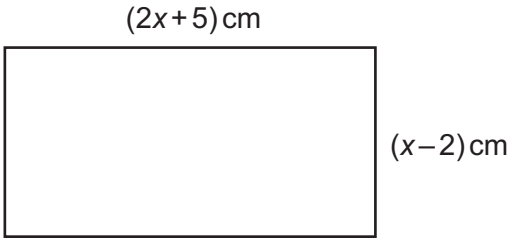
- a reflection in the line $y = x$, followed by
- a rotation of 90° anti-clockwise about (0, 0).

You may use the grid to help you.

.....

..... **[3]**

12 The rectangle has a length $(2x + 5)$ cm and width $(x – 2)$ cm.



Not to scale

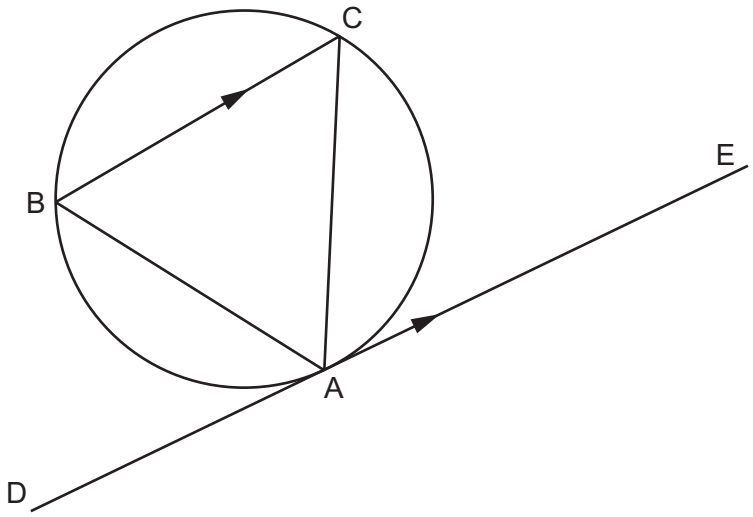
The rectangle has an area of $35\,cm^2$.

Use algebra to find the value of x.

$x =$ ..... **[7]**

13 The diagram shows points A, B and C on the circumference of a circle.
Line DAE is a tangent to the circle.
DE is parallel to BC.

Not to scale



Prove that triangle ABC is an isosceles triangle.
Give the reason for each step in your proof. **[5]**

14 Jenny is practising the long jump.
The table summarises the distances jumped by Jenny.

Distance, d (metres)	$5.2 < d \leqslant 5.4$	$5.4 < d \leqslant 5.6$	$5.6 < d \leqslant 5.8$	$5.8 < d \leqslant 6.0$	$6.0 < d \leqslant 6.2$	$6.2 < d \leqslant 6.4$
Frequency	3	4	6	8	7	4

(a) Complete the cumulative frequency table.

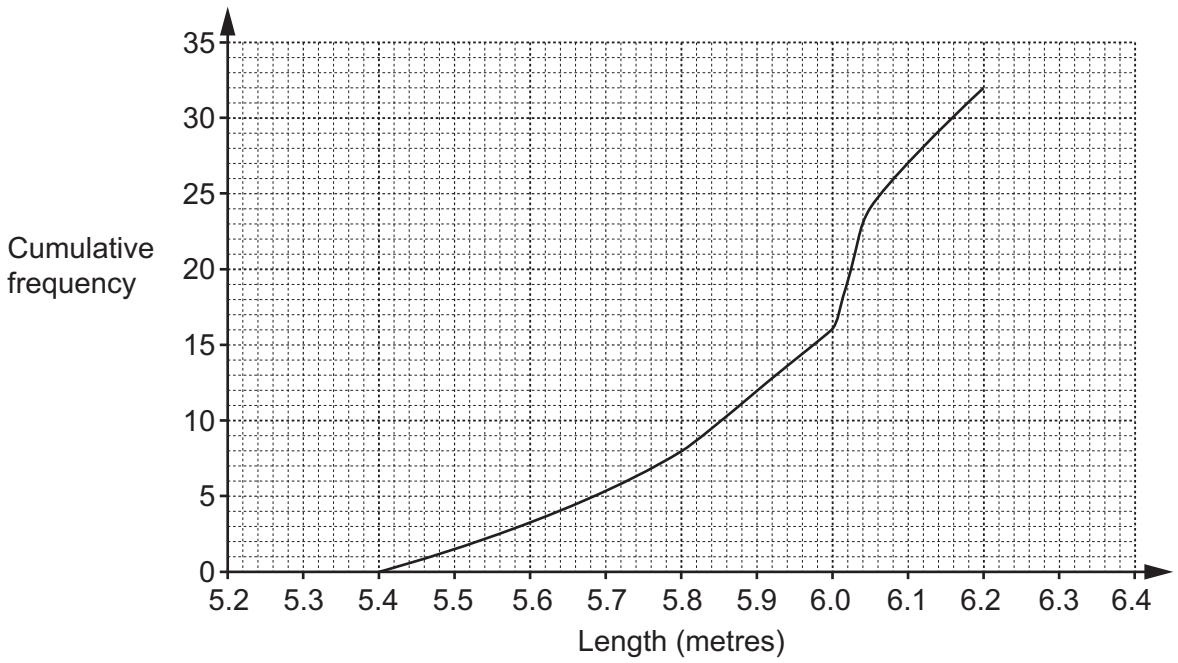
Distance, d (metres)	$d \leqslant 5.4$	$d \leqslant 5.6$	$d \leqslant 5.8$	$d \leqslant 6.0$	$d \leqslant 6.2$	$d \leqslant 6.4$
Cumulative frequency	3					

[2]

(b) The cumulative frequency graph below summarises the distances jumped by Fran.

(i) How many of Fran's jumps were less than 5.9 metres long?

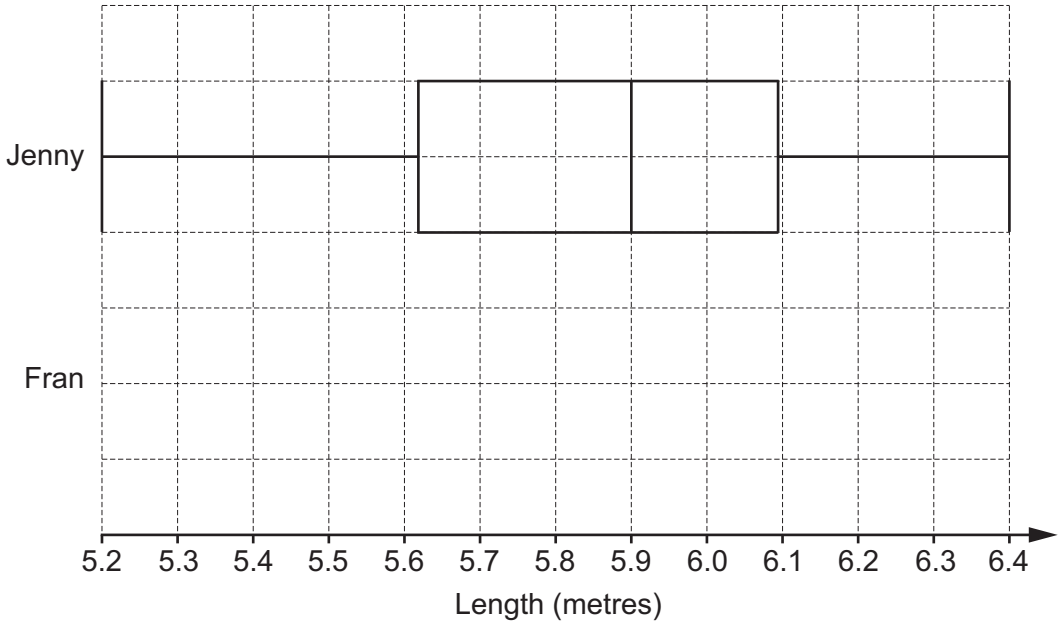
(b)(i) ..... **[1]**



(ii) On the same diagram, draw the cumulative frequency graph for the distances jumped by Jenny. **[2]**

(c) The box plot shows the distribution of the distances jumped by Jenny.

Draw the box plot for the distances jumped by Fran.



[3]

(d) Decide whether Jenny or Fran best satisfies each of the following questions.
Give a reason for each of your decisions.

(i) Who jumps longer on average?

..... because .....

..... **[1]**

(ii) Who is the more consistent jumper?

..... because .....

..... **[1]**

(iii) Who might produce the longer jump?

..... because .....

..... **[1]**

15 Some boxes are to be loaded into a van.

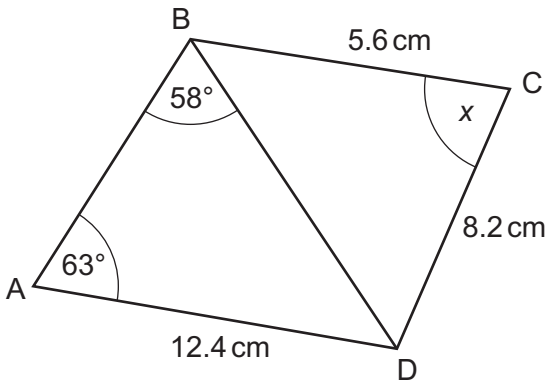
Each box measures exactly 40 cm by 30 cm by 50 cm.
Each box weighs 40 kg, correct to the **nearest kilogram**.

The loading space in the van measures exactly 110 cm by 90 cm by 180 cm.
The maximum total weight of the boxes that can be loaded into the van is 890 kg, correct to the **nearest 10 kilograms**.

Work out the maximum number of boxes that can be loaded into the van without exceeding the weight limit.
Show clearly how you worked out your answer.

..... **[5]**

16 ABD and CBD are triangles.



Not to scale

BC = 5.6 cm, CD = 8.2 cm and AD = 12.4 cm.
Angle DAB = 63° and angle DBA = 58°.

Calculate the angle marked *x*.

..... ° **[5]**

17 **(a)** The table shows values of x and y.

x	2	4	5
y	12	48	75

Show that y is directly proportional to x^2. **[2]**

(b) b is inversely proportional to the square root of a.
b is 12 when a is 9.

Find a formula linking a and b.

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

18 Show that $\frac{5}{n+3}+\frac{2}{n-1}=\frac{7n+1}{(n+3)(n-1)}$. **[3]**

19 Solve these simultaneous equations algebraically.

$$y = x^2 - 3x - 4$$
$$2x + y = 2$$

$x =$ ..... $y =$ .....

$x =$ ..... $y =$ ..... **[6]**

END OF QUESTION PAPER

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