OCR
Oxford Cambridge and RSA

H

GCSE (9–1) Mathematics

J560/05 Paper 5 (Higher Tier)

Practice Paper

Date – Morning/Afternoon

Time allowed: 1 hour 30 minutes

You may use:
- Geometrical instruments
- Tracing paper

Do not use:
- A calculator

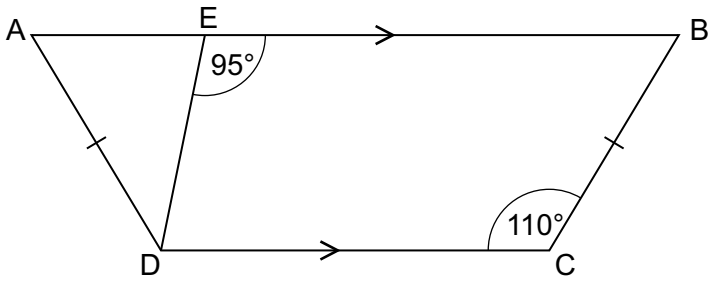
First name									
Last name									
Centre number						**Candidate number**				

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 bar codes.

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 ABCD is a trapezium.
AD = BC.



Not to scale

Work out

(a) angle EBC,

(a) ..... ° **[1]**

(b) angle ADE.

(b) ..... ° **[2]**

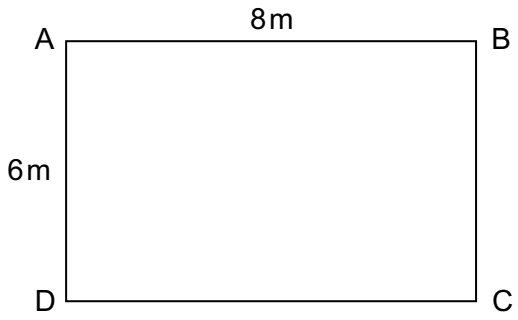
2 The angles in a triangle are in the ratio 1 : 2 : 3.
Neil says

This is a right-angled triangle.

Is Neil correct?
Show your reasoning.

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

3 ABCD is a rectangle.



Not to scale

(a) Sunita calculates the length of AC, but gets it wrong.

$8^2 - 6^2 = AC^2$

$\sqrt{28} = AC$

$\sqrt{28} = 5.29$ or -5.29

$AC = 5.29$

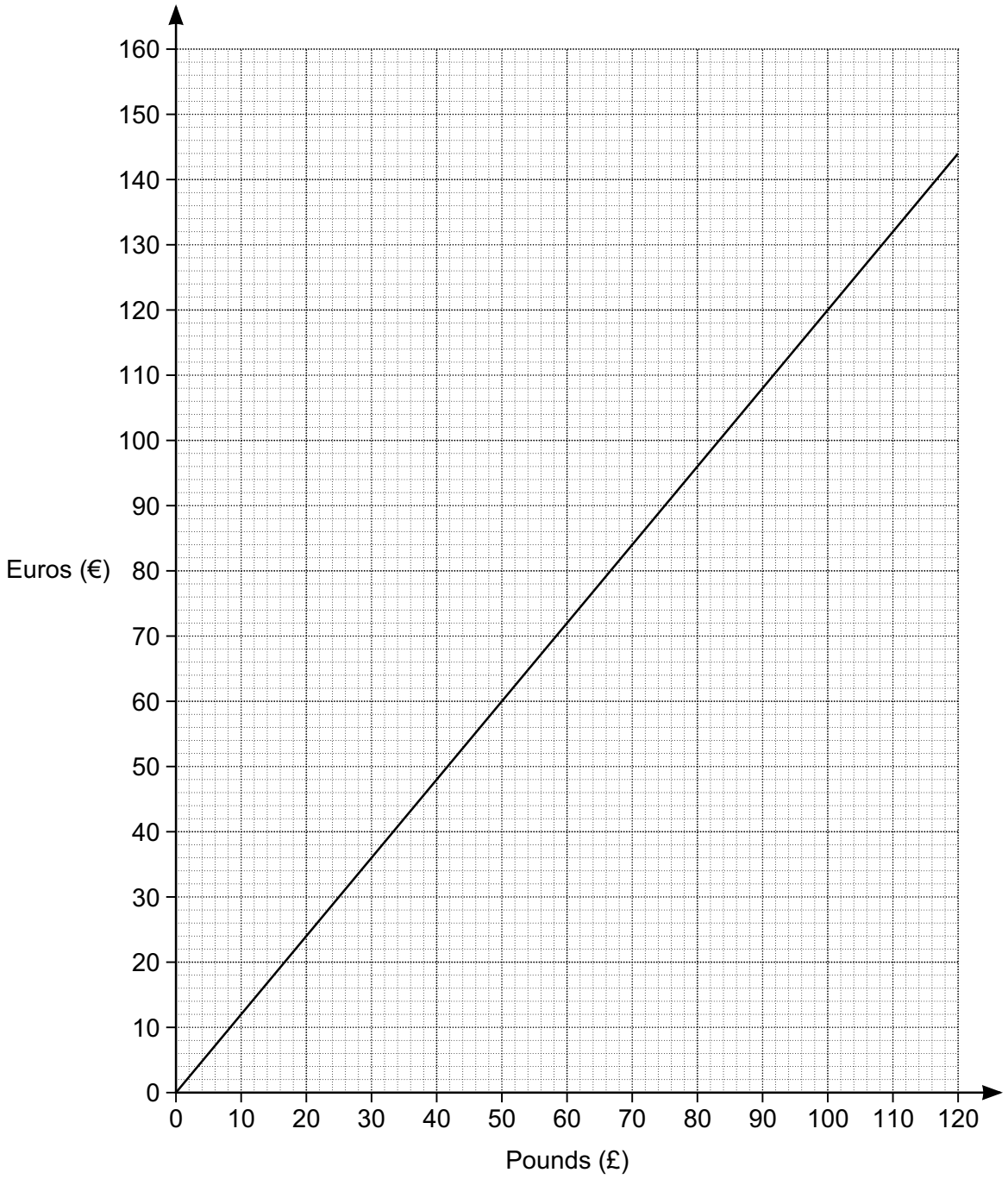
Explain what Sunita has done wrong.

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

(b) Calculate the length of AC.

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

4 This is a conversion graph between pounds and euros.



(a) Convert £36 into euros.

(a) € ..... **[1]**

(b) **(i)** Convert €400 into pounds.

(b)(i) £ ..... **[3]**

(ii) State an assumption that you have made in working out your answer to part **(b)(i)**.

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

(c) Explain how the graph shows that the number of euros is directly proportional to the number of pounds.

.....

..... **[2]**

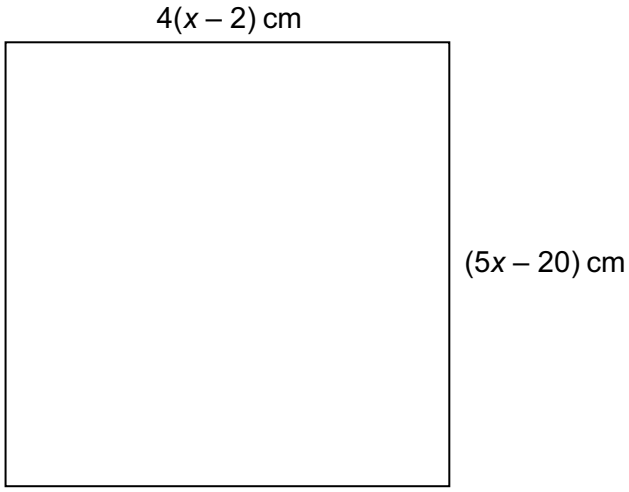
5 Kamile sells sandwiches.

In May, she sold 400 sandwiches.
In June, Kamile sold 20% more sandwiches than in May.
In July, Kamile sold 15% fewer sandwiches than in June.

Calculate the percentage change in her sales from May to July.

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

6 This is a square.

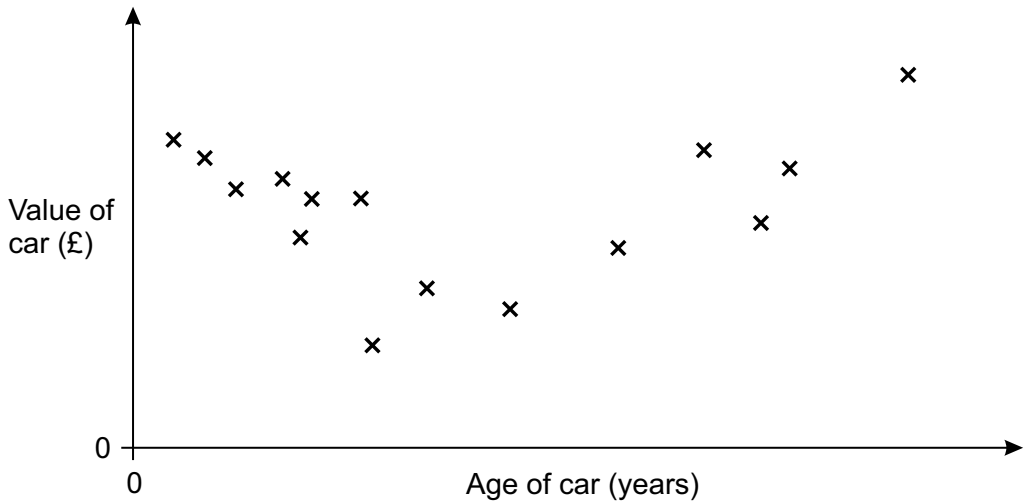


Not to scale

Work out the length of the side of the square.

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

7 This scatter graph shows the values of 15 sports cars plotted against their ages.



(a) **(i)** Lewis thinks that there is **no correlation** between the ages and values of these cars.

Is Lewis correct?
Give a reason for your answer.

.....

..... **[2]**

(ii) Sebastian thinks that there is a **relationship** between the ages and values of these cars.

Is Sebastian correct?
Give a reason for your answer.

.....

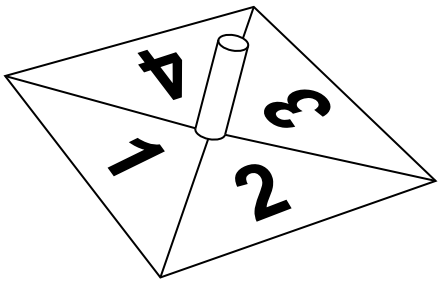
..... **[2]**

(b) The car with the highest value is 40 years old.

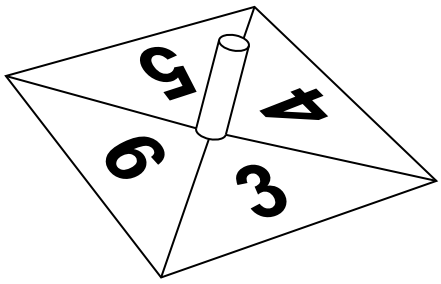
Estimate the age of the car with the lowest value.

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

8 Andrea has these two fair spinners.



Spinner A



Spinner B

(a) Andrea spins **spinner A**.

Calculate the probability that Andrea gets 2 with one spin.

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

(b) Andrea now spins **both** spinners once.
She adds the number she gets on spinner A to the number she gets on spinner B.

(i) Andrea works out the probability that the two numbers she gets add to 4.
Here is her working.

> $1 + 3 = 4$ $\quad$ $3 + 1 = 4$
>
> There are 4 outcomes on each spinner making 8 outcomes in total.
>
> The probability of the two numbers adding to 4 is $\frac{2}{8} = \frac{1}{4}$.

Andrea has made some errors.
Describe these errors.

.....

.....

.....

..... **[2]**

(ii) Find the probability that the two numbers she gets add to 6.

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

9 **(a)** Calculate.

$$2\frac{3}{8} \div 1\frac{1}{18}$$

Give your answer as a mixed number in its lowest terms.

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

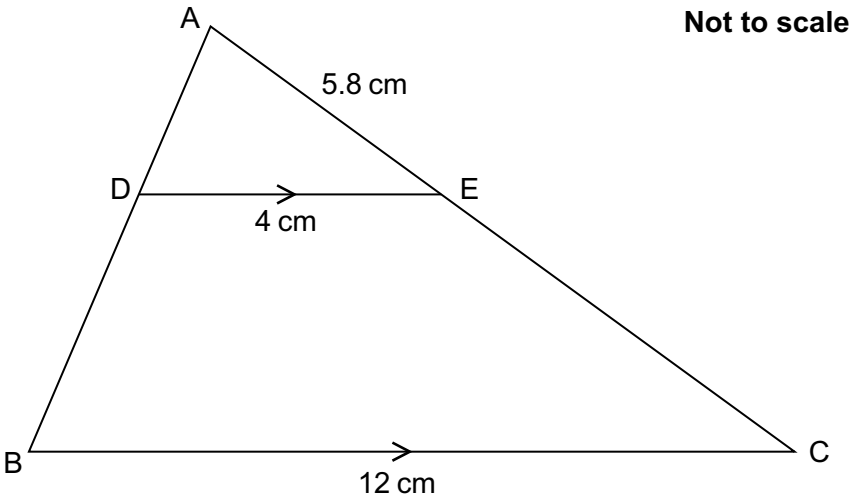
(b) Write $\frac{5}{11}$ as a recurring decimal.

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

(c) Write $0.\dot{3}\dot{6}$ as a fraction in its lowest terms.

(c) ..... **[3]**

10 In the diagram BC is parallel to DE.



(a) Prove that triangle ABC is similar to triangle ADE. **[3]**

(b) Calculate the length of AC.

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

(c) Find the ratio

area of quadrilateral DBCE : area of triangle ABC.

(c) ..... : ..... **[3]**

11 Evaluate.

$$16^{-\frac{3}{2}}$$

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

12 **(a)** Expand and simplify.

$$(x + 7)(x + 2)$$

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

(b) Factorise completely.

$$2x^2 - 6xy$$

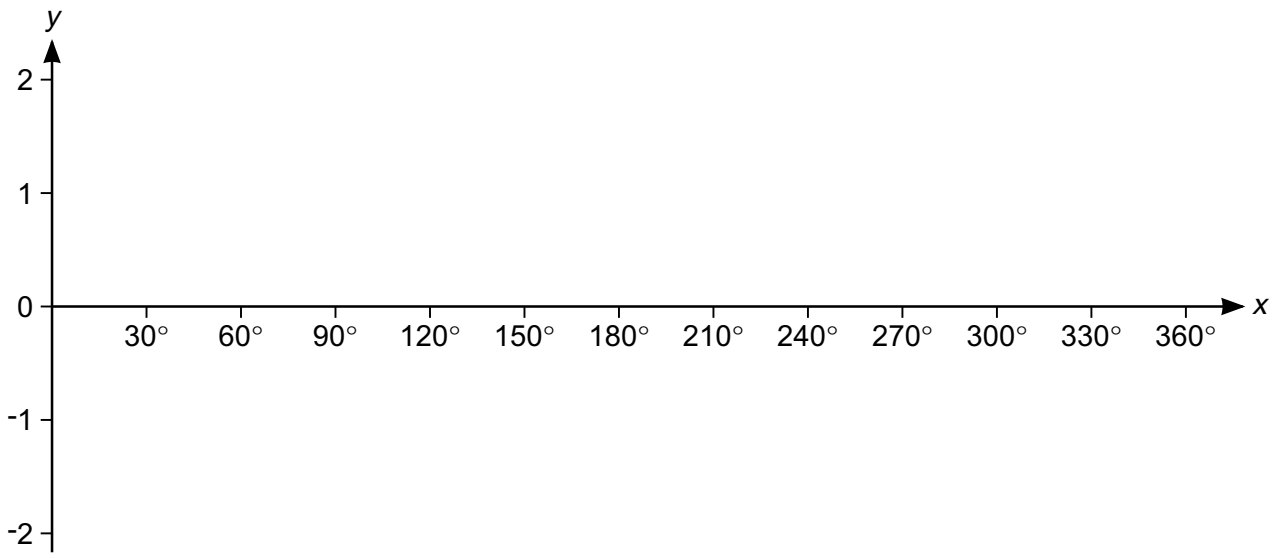
(b) ..... **[2]**

(c) Solve.

$$x^2 + 5x = 24$$

(c) ..... **[3]**

13 **(a)** Sketch the graph of $y = \sin x$ for $0° \leqslant x \leqslant 360°$.



[2]

(b) **(i)** Write down the coordinates of the maximum point of $y = \sin x$ for $0° \leqslant x \leqslant 360°$.

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

(ii) Write down the coordinates of the maximum point of $y = 3 + \sin x$ for $0° \leqslant x \leqslant 360°$.

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

(c) One solution to the equation $4 \sin x = k$ is $x = 60°$.

(i) Find the value of k.

(c)(i) $k =$ ..... **[2]**

(ii) Find another solution for x in the range $0° \leqslant x \leqslant 360°$.

(ii) $x =$ ..... ° **[1]**

14 Here is a sequence.

$$2 \qquad 2\sqrt{7} \qquad 14 \qquad 14\sqrt{7}$$

(a) Work out the next term.

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

(b) Find the nth term.

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

(c) Find the value of the 21st term divided by the 17th term.

(c) ..... **[2]**

15 Tony and Ian are each buying a new car.

There are three upgrades that they can select:

- metallic paint (10 different choices)
- alloy wheels (5 different choices)
- music system (3 different choices).

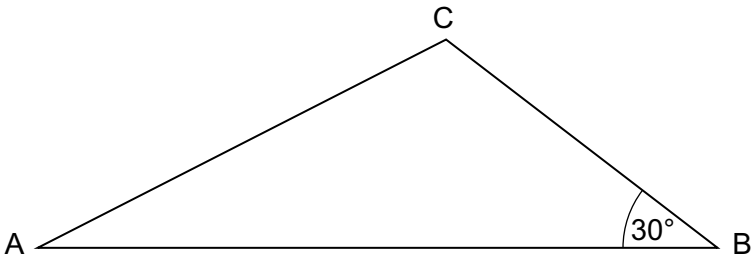
(a) Tony selects all 3 upgrades.

Show that there are 150 different possible combinations. **[1]**

(b) Ian selects 2 of these upgrades.

Show that there are 95 different possible combinations. **[3]**

16 Triangle ABC has area 40 cm^2.
AB = 2BC.



Not to scale

Work out the length of BC.
Give your answer as a surd in its simplest form.

..... cm **[6]**

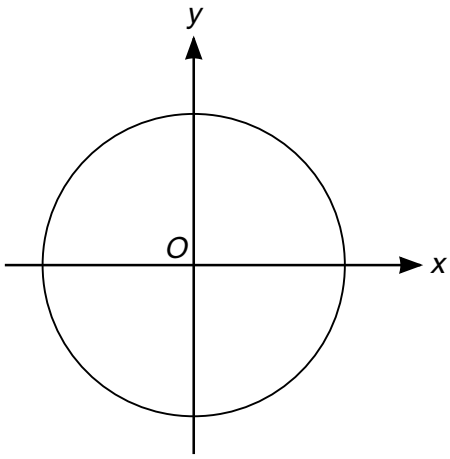
17 A solid metal sphere has radius 9.8 cm.
The metal has a density of 5.023 g/cm^3.

Lynne estimates the mass of this sphere to be 20 kg.

Show that this is a reasonable estimate for the mass of the sphere. **[5]**

[The volume V of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]

18 (a) The diagram shows a circle, centre O.



The circumference of the circle is 20π cm.

Find the equation of the circle.

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

(b) The line $10x + py = q$ is a tangent at the point $(5, 4)$ in another circle with centre $(0, 0)$.

Find the value of p and the value of q.

(b) $p =$ .....

$q =$ ..... **[4]**