

## 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

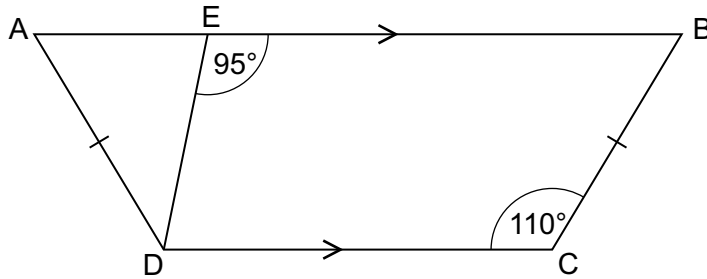
- Use black ink. You may use an HB pencil for graphs and diagrams.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Read each question carefully before you start your answer.
- Where appropriate, your answers should be supported with working. 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]

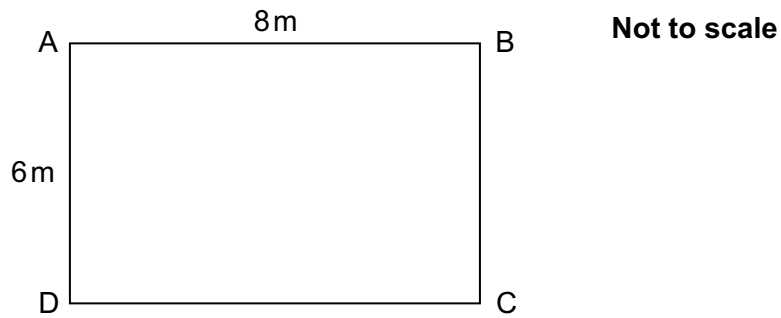
- 2 The angles in a triangle are in the ratio 1 : 2 : 3.  
Neil says

This is a right-angled triangle.

Is Neil correct?  
Show your reasoning.

..... [3]

3 ABCD is a rectangle.



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

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

$$\sqrt{28} = AC$$

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

$$AC = 5.29$$

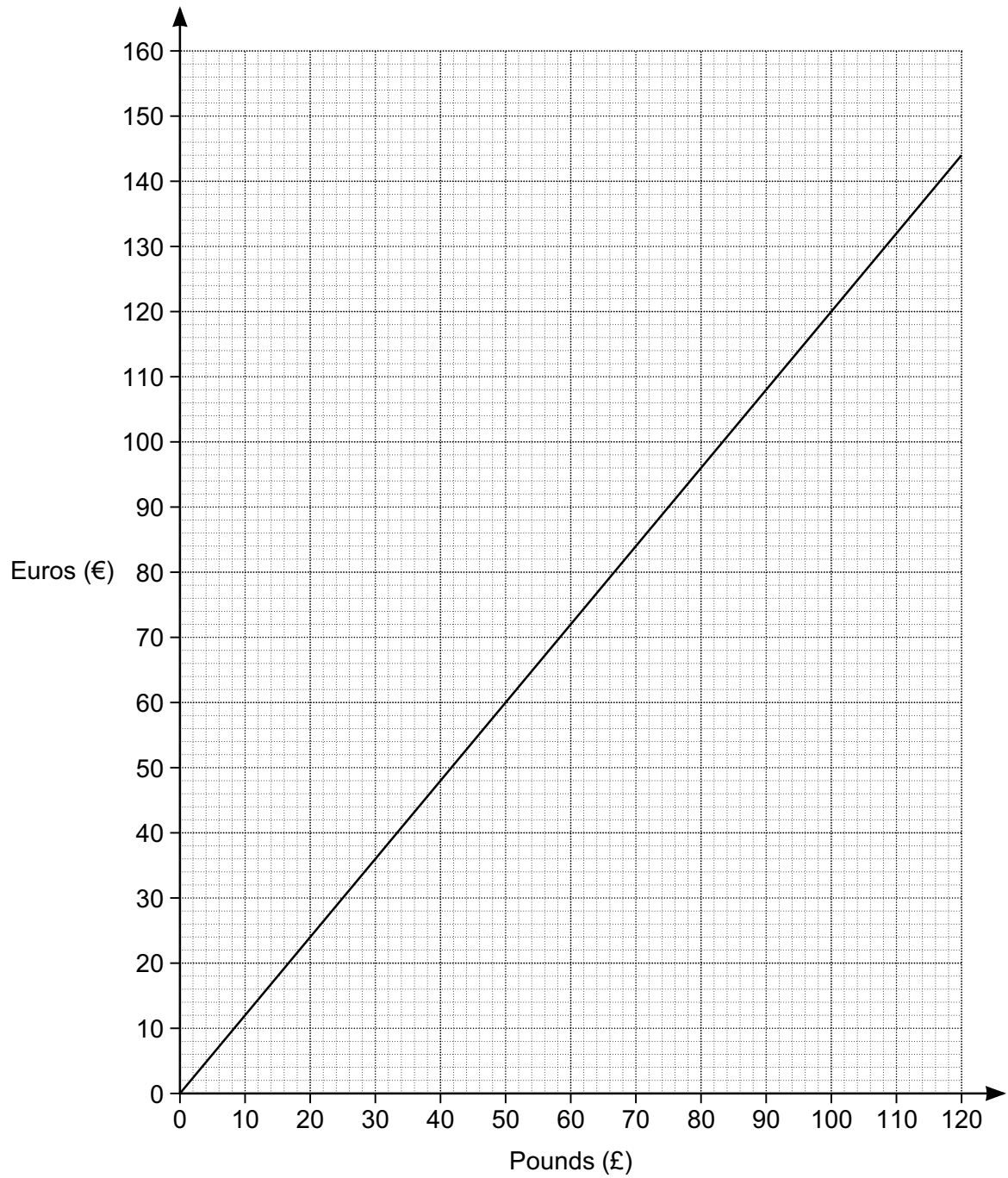
Explain what Sunita has done wrong.

..... [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]

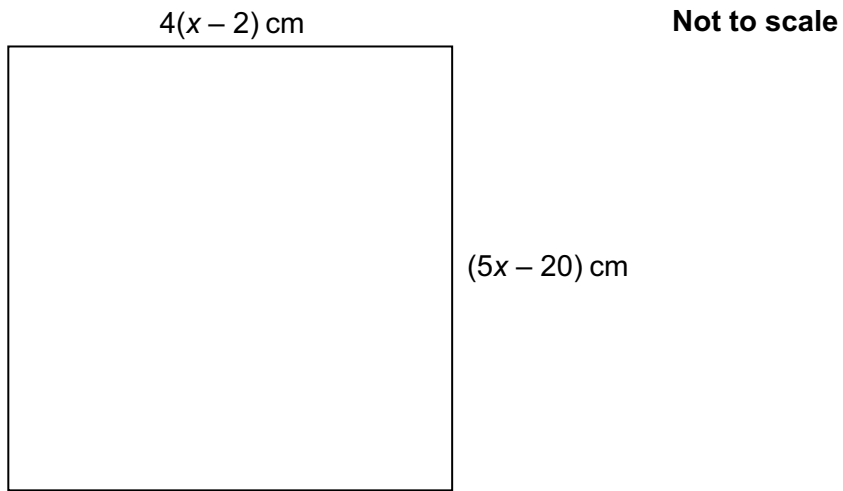
5 Kamile sells sandwiches.

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]

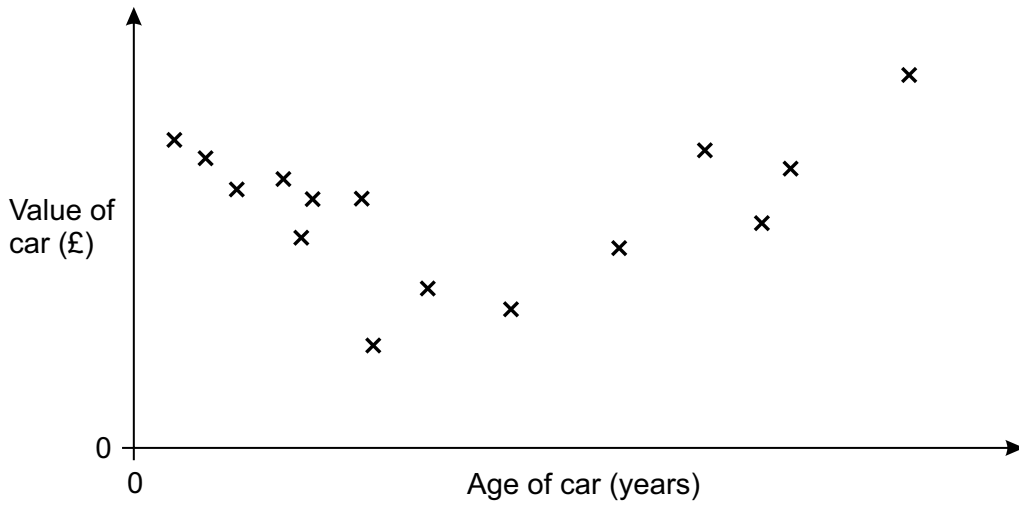
6 This is a square.



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.

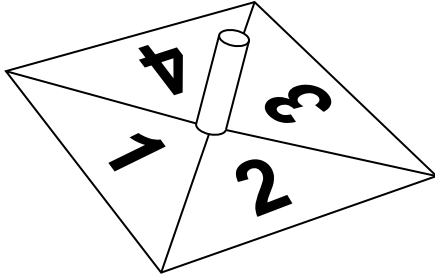
.....  
..... [2]

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

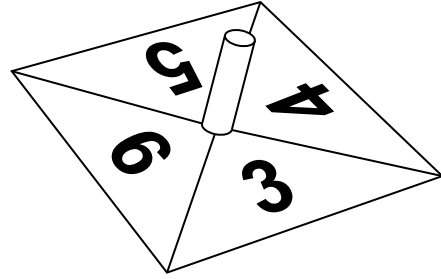
Estimate the age of the car with the lowest value.

(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.

$$1 + 3 = 4$$

$$3 + 1 = 4$$

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]

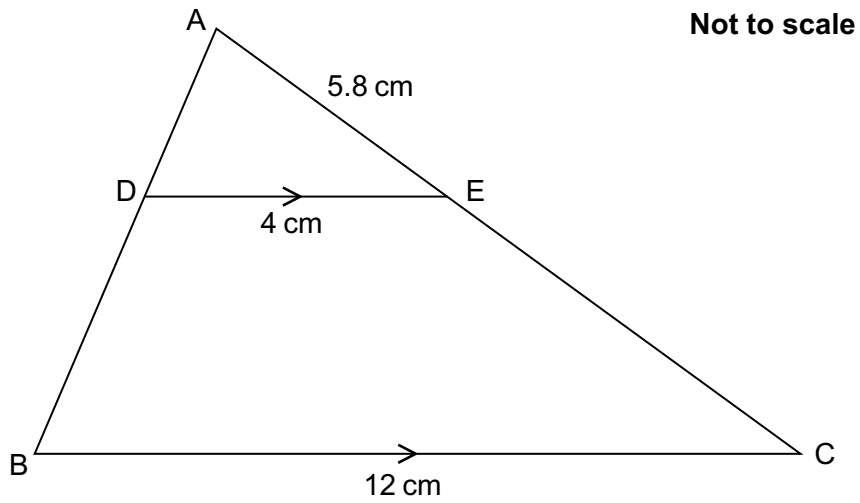
(b) Write  $\frac{5}{11}$  as a recurring decimal.

(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.

$$2x^2 - 6xy$$

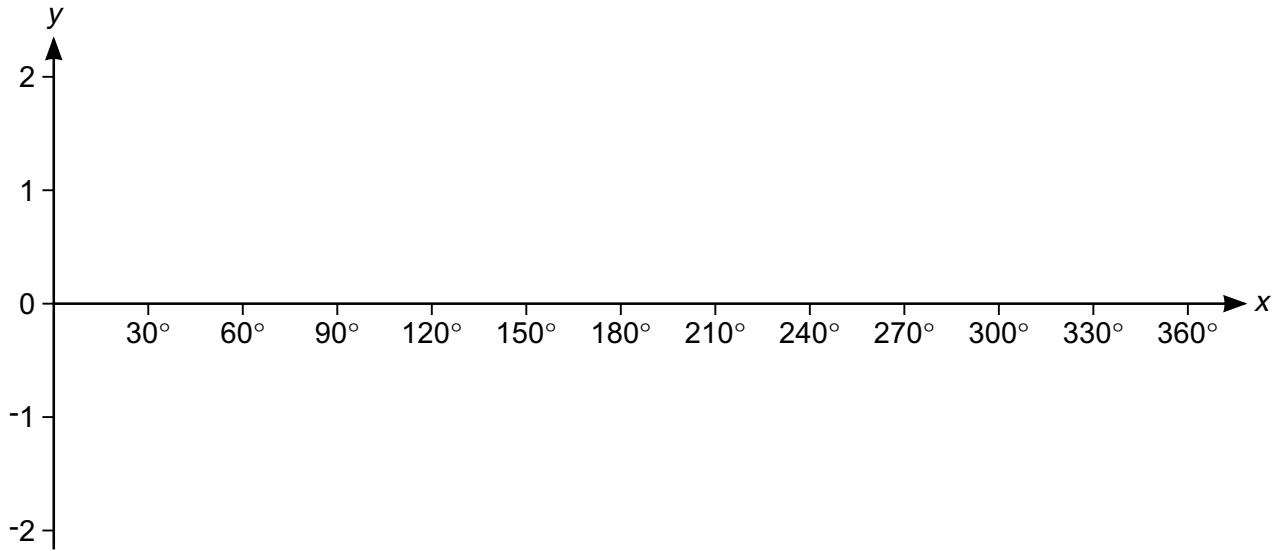
(b) ..... [2]

(c) Solve.

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

(c) ..... [3]

13 (a) Sketch the graph of  $y = \sin x$  for  $0^\circ \leq x \leq 360^\circ$ .



[2]

(b) (i) Write down the coordinates of the maximum point of  $y = \sin x$  for  $0^\circ \leq x \leq 360^\circ$ .

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

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

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

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

(i) Find the value of  $k$ .

(c)(i)  $k = \dots\dots\dots$  [2]

(ii) Find another solution for  $x$  in the range  $0^\circ \leq x \leq 360^\circ$ .

(ii)  $x = \dots\dots\dots^\circ$  [1]

14 Here is a sequence.

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

(a) Work out the next term.

(a) ..... [1]

(b) Find the  $n$ th 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.

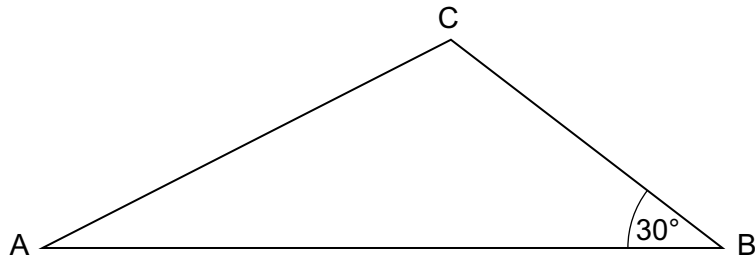
**[1]**

**(b)** Ian selects 2 of these upgrades.

Show that there are 95 different possible combinations.

**[3]**

- 16 Triangle ABC has area  $40 \text{ cm}^2$ .  
 $AB = 2BC$ .



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  $5.023 \text{ g/cm}^3$ .

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

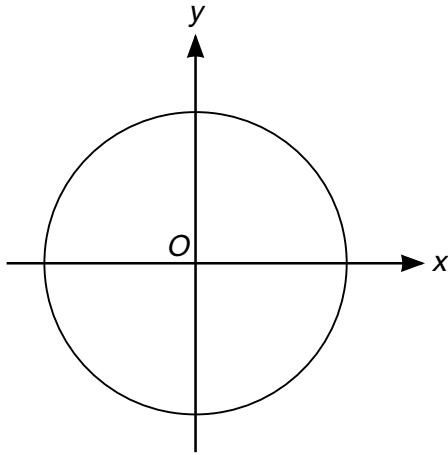
Show that this is a reasonable estimate for the mass of the sphere.

[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  $20\pi$  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]

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