

GCSE
Mathematics
Specification (8300/2F)
Paper 2 Foundation tier

F

Date

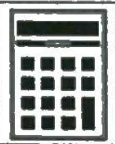
Morning

1 hour 30 minutes

Materials

For this paper you must have:

- a calculator
- mathematical instruments.



Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the bottom of this page.
- Answer all questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book.
- In all calculations, show clearly how you work out your answer.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

Please write clearly, in block capitals, to allow character computer recognition.

Centre number

Candidate number

Surname

Forename(s)

Candidate signature _____

Answer all questions in the spaces provided.

- 1 Which of these numbers is **one more** than a multiple of 5?
Circle your answer.

[1 mark]

15

19

26

30

$$25 + 1$$

- 2 Which of these numbers has **exactly three** factors?
Circle your answer.

[1 mark]

3

4

5

6

1, 2, 4

- 3 Which of these numbers is 6 less than -1.4 ?
Circle your answer.

[1 mark]

-8.4

-7.4

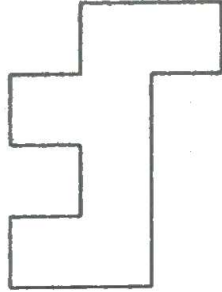
-2.0

4.6

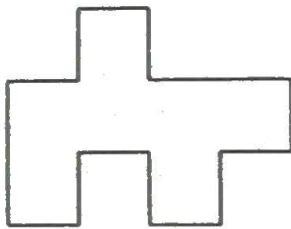
- 4 Which shape is congruent to shape X?
Circle the correct letter.

[1 mark]

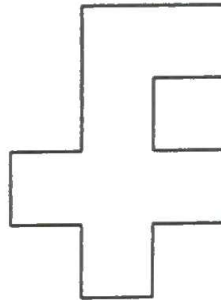
X



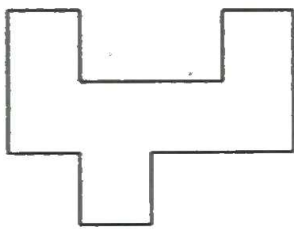
A



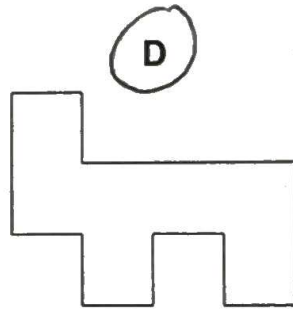
B



C

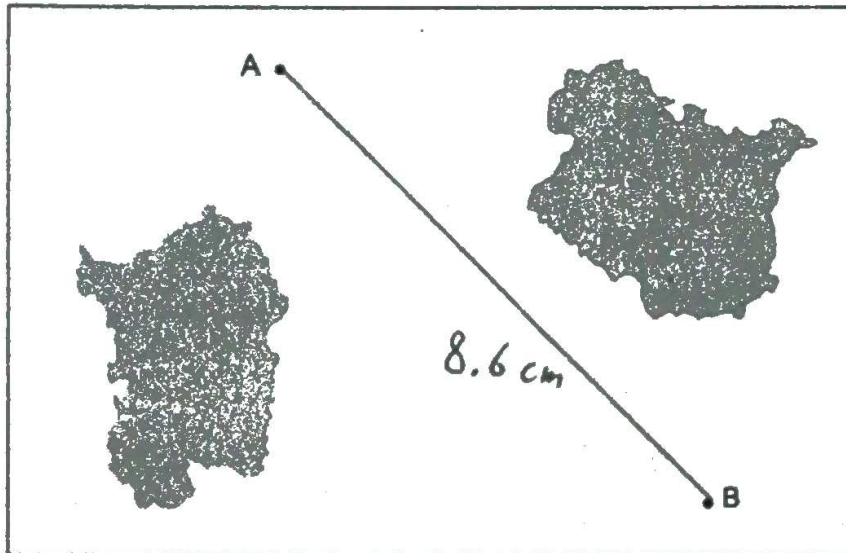


D



- 5 The map shows the positions of two ships, A and B.

Scale: 1 cm represents 2.5 km



Work out the actual distance between the ships.

[2 marks]

$$8.6 \times 2.5 = 8.6 \times 2 + 8.6 \times 0.5$$

$$= 21.5$$

Answer 21.5 km

6 A gym has 275 members.

40% are bronze members.

28% are silver members.

The rest are gold members.

Work out the number of gold members.

[3 marks]

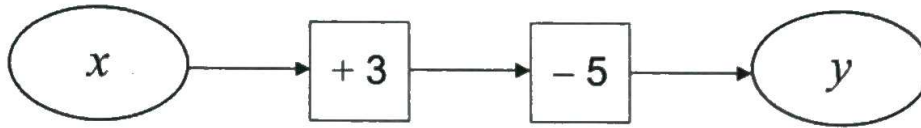
$$100 - 40 - 28 = 32\% \text{ GOLD MEMBERS}$$

$$0.32 \times 275 = 88$$

Answer 88

Turn over for the next question

- 7 (a) Alan is looking at number machine problems.



He says,

"If I know y I can work out x .
I subtract 3 then I add 5."

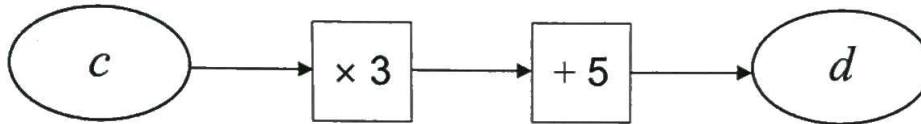
Does this method work?

Give a reason for your answer.

[1 mark]

YES, BECAUSE THOSE ARE THE CORRECT
INVERSE OPERATIONS AND (IN THIS CASE)
ORDER DOESN'T MATTER

- 7 (b)



He says,

"If I know d I can work out c .
I divide by 3, then subtract 5."

Does this method work?

Give a reason for your answer.

[1 mark]

NO, BECAUSE WHILST THESE ARE THE CORRECT
INVERSE OPERATIONS, THEY ARE IN THE WRONG
ORDER AND THAT WILL AFFECT THE RESULT HERE.

8 (a) Solve $5w - 11 = 24$

[2 marks]

$$\begin{array}{l} +11 \\ \hline \div 5 \end{array} \left| \begin{array}{l} 5w - 11 = 24 \\ 5w = 35 \\ w = 7 \end{array} \right. \begin{array}{l} +11 \\ \hline \div 5 \end{array}$$

$w = 7$

8 (b) Write an expression for the total cost, in pounds, of

x jumpers at £15 each
and
 y shirts at £12 each.

[1 mark]

Answer $15x + 12y$

8 (c) Simplify $x + x + y \times y$

[1 mark]

$$x + x = 2x, \quad y \times y = y^2$$

Answer $2x + y^2$

9

Lucy says,

"3 is odd and 2 is even,
so when you add a multiple of 3 to a multiple of 2 the answer is always odd."

Is she correct?

Write down a calculation to support your answer.

[1 mark]

NO. 6 IS A MULTIPLE OF 3, AND 4 IS A MULTIPLE
OF 2, BUT $6 + 4 = 10$, WHICH IS EVEN.

10

Tom earns £9.20 per hour.

He works for

24 hours each week

48 weeks each year.

He pays tax if he earns more than £10 000 per year.

Does Tom pay tax?

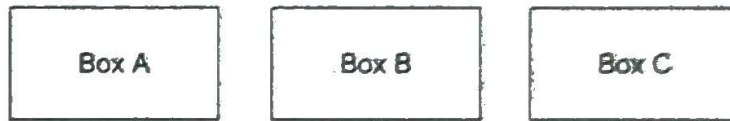
You **must** show your working.

[2 marks]

$$24 \times 48 \times 9.2 = 10598.4 > 10,000$$

SO YES, TOM PAYS TAX

11 Three boxes contain counters.



There are 62 counters in total.

The total number of counters in box A and box B is 34

The difference between the number of counters in box A and box C is 9

Work out the number of counters in each box.

[3 marks]

$$62 - 34 = 28 \text{ IN BOX C}$$

$$28 - 9 = 19 \text{ IN BOX A}$$

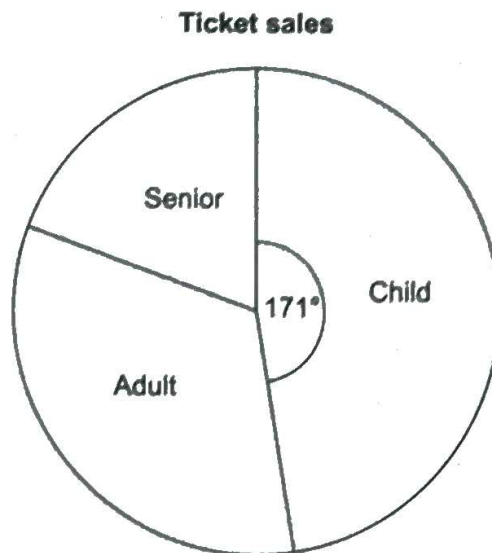
$$34 - 19 = 15 \text{ IN BOX B}$$

Box A 19 Box B 15 Box C 28

Turn over for the next question

12

The pie chart shows information about the sales of 800 tickets.
There were twice as many adult ticket sales as senior ticket sales.



Not drawn
accurately

12 (a) Show that there were 140 senior ticket sales.

[3 marks]

$$360 - 171 = 189,$$

$$\text{So, } 189/3 = 63^\circ \text{ :- SENIORS (\& 126^\circ \text{ :- ADULTS)}$$

$$\frac{63}{360} \times 800 = 140 \text{ SENIOR TICKETS}$$

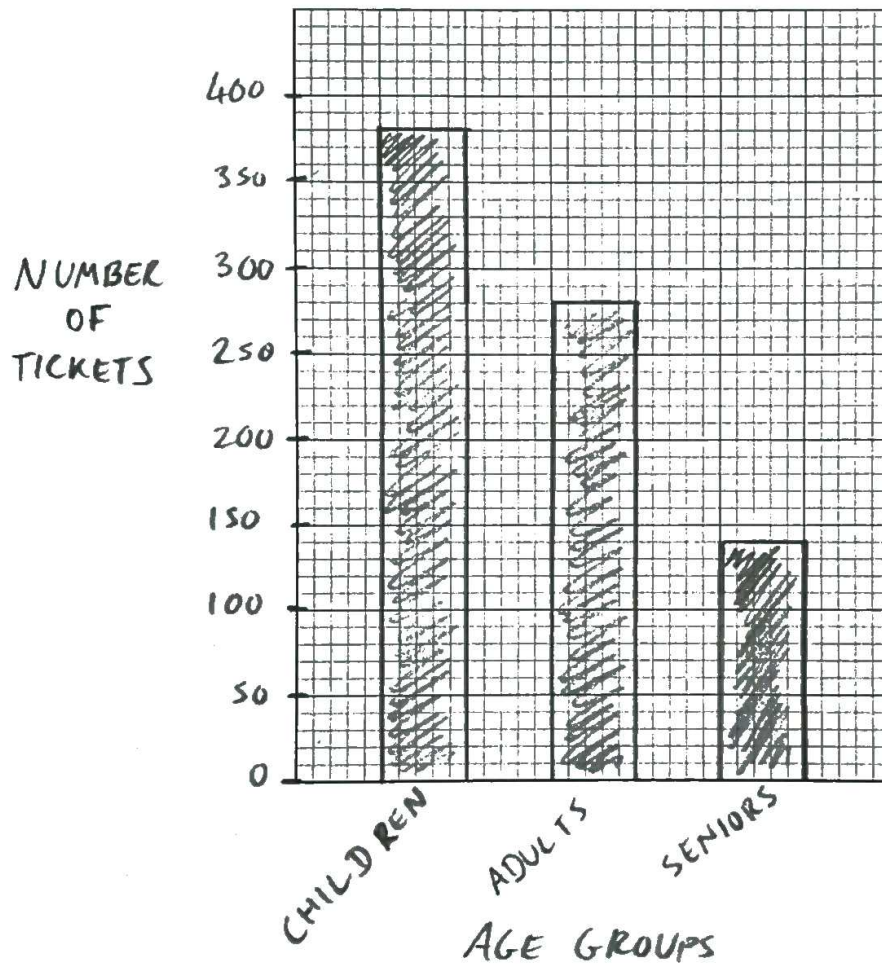
12 (b) Draw a bar chart on the grid to represent the child, adult and senior ticket sales.

[4 marks]

$$\frac{126}{360} \times 800 = 280 \text{ ADULT TICKETS}$$

$$\frac{171}{360} \times 800 = 380 \text{ CHILD TICKETS}$$

Ticket sales



- 13 Alice makes cards.
Each card uses 42 cm of ribbon.
She has 1000 cm of ribbon.

- 13 (a) Work out the maximum number of cards she can make.

[2 marks]

$$\begin{array}{r} 1000 \\ \underline{42} \end{array} = 23.8\dots$$

Answer 23

- 13 (b) How much ribbon will be left over?

[1 mark]

$$1000 - (23 \times 42) = 34$$

Answer 34 cm

14 Luke saves 10p coins and 20p coins.

He has

three times as many 10p coins as 20p coins

a total of £17 = 1700p

How many 10p coins does he have?

[3 marks]

$$(10 + 10 + 10 + 20)x = 1700$$

$$x = \frac{1700}{50} = 34$$

34 LOTS OF "3 10p COINS & 1 20p COIN"

$$\text{NUMBER OF 10p COINS} = 34 \times 3 = 102$$

Answer 102

Turn over for the next question

- 15 A company has bikes for hire.
The cost, £C, to hire a bike for n days is given by the formula

$$C = 12 + \frac{27}{4}(n - 1)$$

- 15 (a) Write down the cost to hire a bike for 1 day.

[1 mark]

Answer £

12

- 15 (b)

Special offer

Hire a bike for £9 per day

Is it cheaper to hire a bike for 7 days using the special offer?

You must show your working.

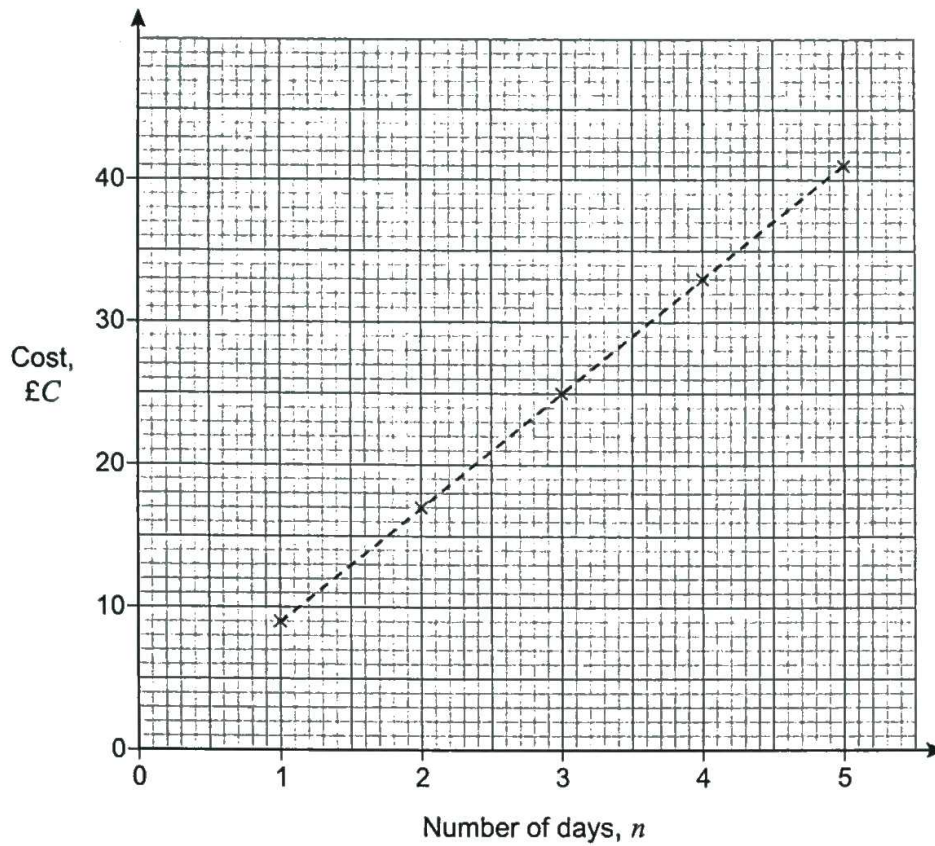
[2 marks]

OFFER FOR 7 DAYS: $7 \times 9 = £63$

NORMAL PRICE: $12 + \frac{27}{4}(7-1) = £52.50$

SO NO, IT'S NOT CHEAPER TO USE THE
OFFER IF YOU HIRE A BIKE FOR 7 DAYS

15 (c) The graph shows the cost to hire a bike for one to five days at a different company.



The cost, £C, to hire a bike for n days using this company is given by the formula

$$C = a + b(n - 1)$$

Work out the values of a and b .

[3 marks]

WHEN $n = 1$, $C = 9$, so $a = 9$

WHEN $n = 2$, $C = 17$, so: $17 = 9 + b$

$\therefore b = 8$

$a = 9$ $b = 8$

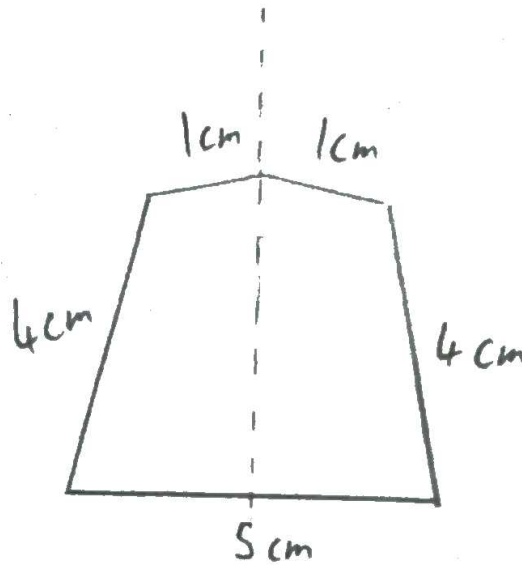
16 A company's logo

- is a pentagon
- has exactly one line of symmetry
- has sides with whole number lengths
- has a perimeter of 15 cm

Draw a sketch of a possible logo.

Label each side with its length.

[2 marks]



17 Mr Jones works for five days each week.

If he uses his car to travel to work,

each day he drive a total distance of 24.2 miles

his car travels 32.3 miles per gallon of petrol

petrol costs £1.27 per litre.

If he uses the bus to travel to work, he can buy a weekly ticket for £19.50

Use 1 gallon = 4.5 litres

Is it cheaper if he uses his car or the bus to travel to work?

You must show your working.

[5 marks]

$$5 \times 24.2 = 121 \text{ miles, TOTAL}$$

$$\frac{121}{32.3} = 3.746... \text{ (3d.p.) GALLONS}$$

$$(3.746...) \times 4.5 \times 1.27 = \pounds 21.40 > \pounds 19.50$$

\therefore BUS IS CHEAPER

Answer

BUS

19

Josef runs 400 metres in 1 minute.

He assumes he can run any distance at the same rate.

He says,

"I would run 10 000 metres in 25 minutes."

Tick a box to show whether his time to run 10 000 metres is likely to be accurate.

No, the time will be longer

Yes, the time will be 25 minutes

No, the time will be shorter

Give working and a reason to support your answer.

[2 marks]

$$10,000 \div 400 = 25$$

THE TIME WILL BE LONGER BECAUSE HE WON'T BE ABLE TO RUN 10,000m AT THE SAME SPEED AS HE RUNS 400m.

20

Which sequence is a geometric progression?

Circle your answer.

[1 mark]

1 2 3 4

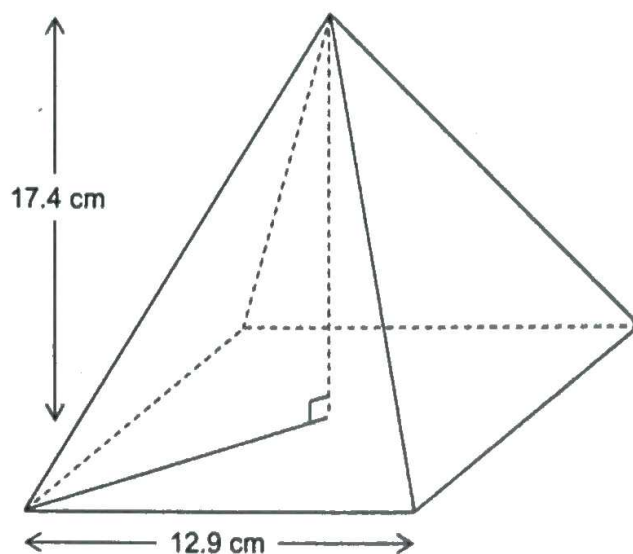
1 2 4 7

1 2 4 8

1 2 3 5



- 21 This pyramid has a square base.



Volume of a pyramid = $\frac{1}{3} \times \text{area of base} \times \text{perpendicular height}$

Work out the volume of the pyramid.

[3 marks]

$$\text{AREA OF BASE} = 12.9^2 = 166.41$$

$$\begin{aligned} \text{VOLUME} &= \frac{1}{3} \times 166.41 \times 17.4 \\ &= 965.2 \text{ cm}^3 \text{ (1d.p.)} \end{aligned}$$

Answer 965.2 cm^3

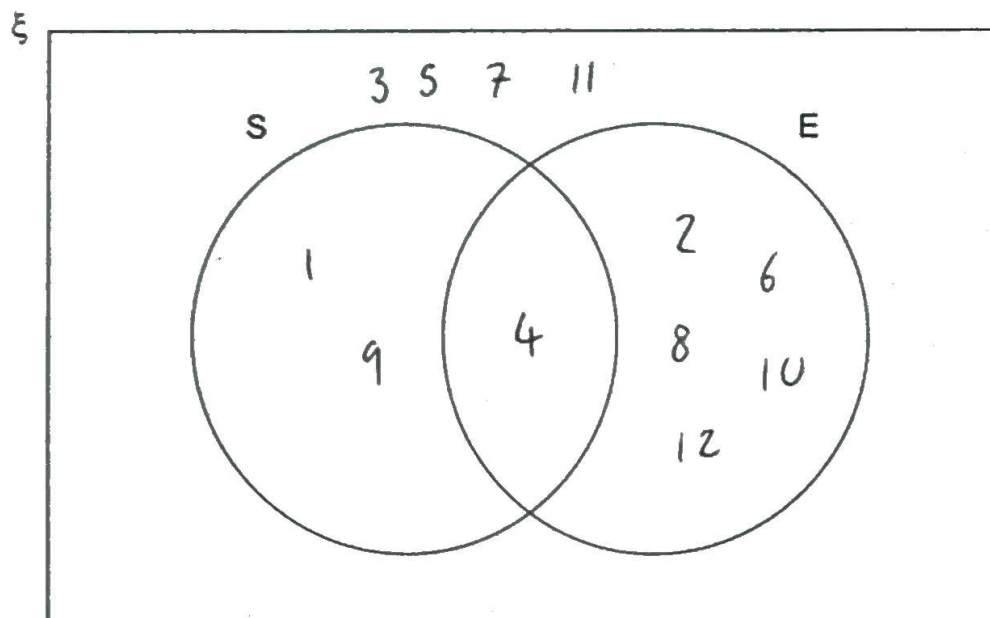
22 $\xi = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

S = square numbers

E = even numbers

22 (a) Complete the Venn diagram.

[3 marks]



22 (b) One of the numbers is chosen at random.

Write down $P(S \cap E)$

[1 mark]

$$= P(4)$$

Answer

$$\frac{1}{12}$$

- 23 A coin is rolled onto a grid of squares.
It lands randomly on the grid.
To win, the coin must land completely within one of the squares.

Meera and John each roll the coin a number of times and record their results.

	Number of wins	Number of losses
Meera	6	44
John	28	72

- 23 (a) Work out two different estimates for the probability of winning.

[2 marks]

$$\frac{6}{6+44} = \frac{6}{50} = \frac{3}{25}, \quad \frac{28}{28+72} = \frac{28}{100} = \frac{7}{25}$$

Answer $\frac{3}{25}$ and $\frac{7}{25}$

- 23 (b) Which of your estimates is the better estimate for the probability of winning?
Give a reason for your answer.

[1 mark]

Answer

$$\frac{7}{25}$$

Reason

THIS PROBABILITY WAS CALCULATED
USING A LARGER NUMBER OF TRIALS

- 24 In a sale, the original price of a bag was reduced by $\frac{1}{5}$
The sale price of the bag is £29.40

Work out the original price.

[3 marks]

SALE PRICE IS $\frac{4}{5} = 0.8$ OF ORIGINAL PRICE

$$\text{ORIGINAL PRICE} \times 0.8 = 29.40,$$

$$\therefore \text{ORIGINAL PRICE} = \frac{29.40}{0.8} = 36.75$$

Answer £ 36.75

- 25 Which of these is **not** used to prove that triangles are congruent?
Circle your answer.

[1 mark]

SSS

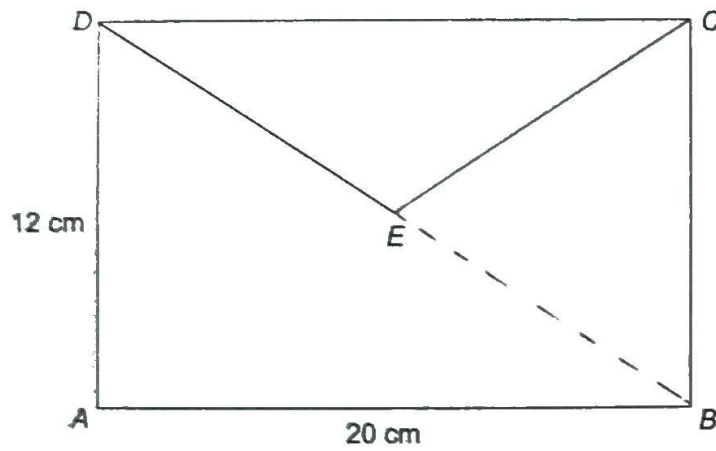
SAS

AAA

RHS

Turn over for the next question

26

 E is the centre of rectangle $ABCD$.Not drawn
accuratelyWork out the length DE .

[3 marks]

$$\text{LENGTH } DE = \frac{1}{2} \times \text{LENGTH } DB$$

$$12^2 + 20^2 = c^2, \quad c = \sqrt{544} = 4\sqrt{34} = \text{LENGTH } DB$$

$$\text{LENGTH } DE = \frac{4\sqrt{34}}{2} = 2\sqrt{34}$$

Answer $2\sqrt{34}$ cm

27

Circle the equation of a line that is parallel to $y = 5x - 2$

[1 mark]

$y = 2x - 5$

$y = 5x + 2$

$y = 3x - 2$

$y = -\frac{1}{5}x - 2$

28

At a school

number of boys : number of girls = 9 : 7

There are 116 more boys than girls.

Work out the total number of students at the school.

[3 marks]

GIRLS : BOYS : DIFFERENCE

$$\begin{array}{r}
 7 \quad : \quad 9 \quad : \quad 2 \\
 \downarrow \times 58 \quad \downarrow \times 58 \quad \downarrow \times 58 \\
 406 \quad : \quad 522 \quad : \quad 116
 \end{array}$$

$$TOTAL = 406 + 522 = 928$$

Answer 928

29

Circle the equation with roots 4 and -8

[1 mark]

$$4x(x - 8) = 0$$

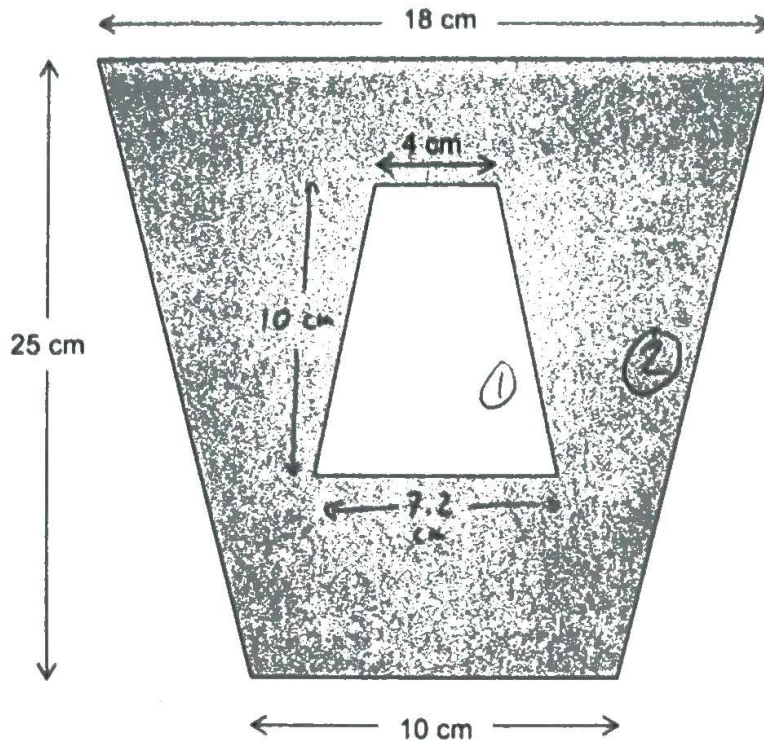
$$(x - 4)(x + 8) = 0$$

$$x^2 - 32 = 0$$

$$(x + 4)(x - 8) = 0$$

30

A pattern is made from two similar trapeziums.

Not drawn
accuratelyShow that the shaded area is 294 cm^2

[4 marks]

$$10 \div 4 = 2.5 \leftarrow \text{SCALE FACTOR}$$

$$\text{HEIGHT OF ①} = 25 \div 2.5 = 10$$

$$\text{BASE OF ①} = 18 \div 2.5 = 7.2$$

$$\text{AREA OF ①} = \frac{1}{2} \times (7.2 + 4) \times 10 = 56$$

$$\text{AREA OF ②} = \frac{1}{2} \times (18 + 10) \times 25 = 350$$

$$\text{SHADED AREA} = 350 - 56 = \underline{\underline{294 \text{ cm}^2}}$$

END OF QUESTIONS