AQA

NEW SPECIMEN PAPERS
PUBLISHED JUNE 2015

GCSE

Mathematics

Specification (8300/2F)

F

Paper 2 Foundation tier

Date Morning 1 hour 30 minutes

Materials

For this paper you must have:
- a calculator
- mathematical instruments.

Model Solutions

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 ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

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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

5 × 3 = 25

25 + 1 = 26

2 Which of these numbers has **exactly three** factors?

Circle your answer.

[1 mark]

3 4 5 6

1, 2 and 4

1 × 4 = 4

2 × 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

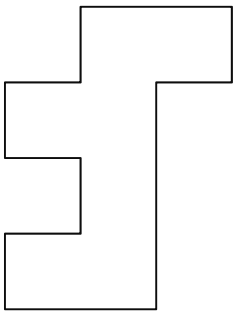
−1.4 − 6 = −7.4

4 Which shape is congruent to shape **X**?

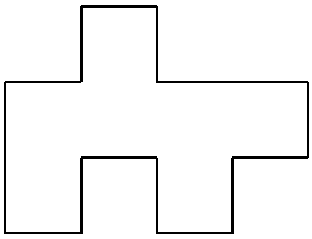
Circle the correct letter.

[1 mark]

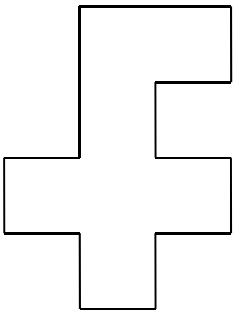
X



A



B



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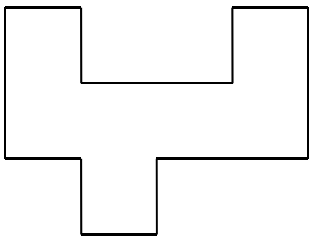
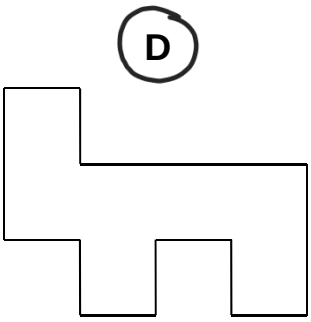
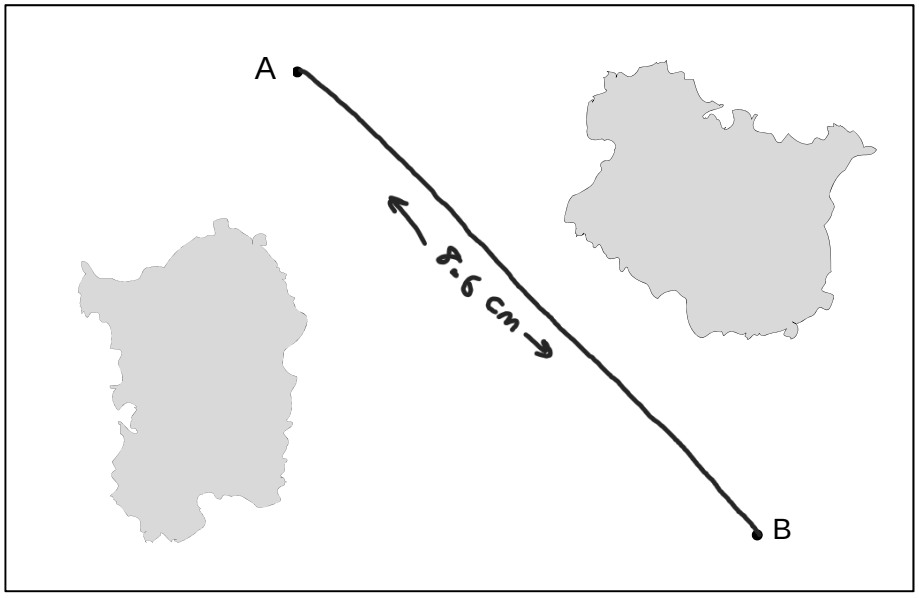


D



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 ↔ ×8.6

1 cm = 2.5 km

8.6 cm = 21.5 km

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]

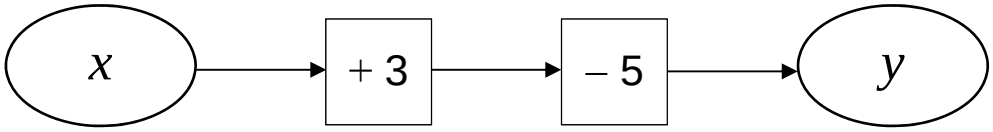
Gold → 100% − (40 + 28) = 32%

32% of 275 → $\frac{32}{100} \times 275 = 88$ members

Answer 88 gold members

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."

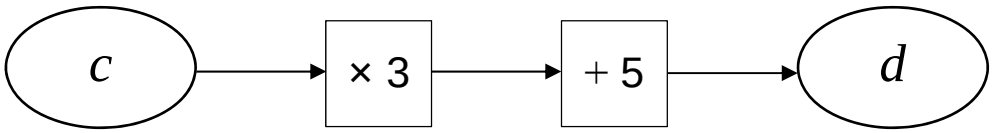
Does this method work?

Give a reason for your answer.

[1 mark]

Yes, because the order of the inverse operations 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 these inverse operations need to be in the correct order.

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

[2 marks]

$5w - 11 = 24 \rightarrow 5w = 24 + 11$

$5w = 35 \rightarrow w = 7$

$w =$ 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]

$15x + 12y$

Answer $15x + 12y$

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

[1 mark]

$2x + y^2$

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, 4 is a multiple of 2

$6+4=10 \rightarrow 2(5)=10 \rightarrow$ 10 is even, not odd.

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?

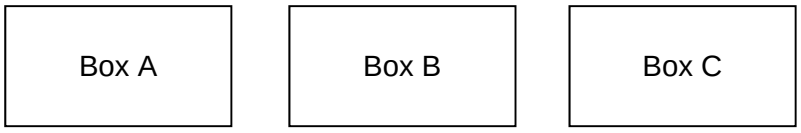
You **must** show your working.

[2 marks]

€9.20 × 24 × 48 = £10598.4 earnt in year

£10,598.4 > £10,000 → So yes he 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]

① $A + B = 34$ ② $C - A = 9$

③ $(A + B) + C = 62$ → $(34) + C = 62$ → $C = 62 - 34 = 28$

$C - A = 9$ → $28 - A = 9$ → $28 - 9 = A$ → $A = 19$

$A + B = 34$ → $19 + B = 34$ → $B = 34 - 19 = 15$

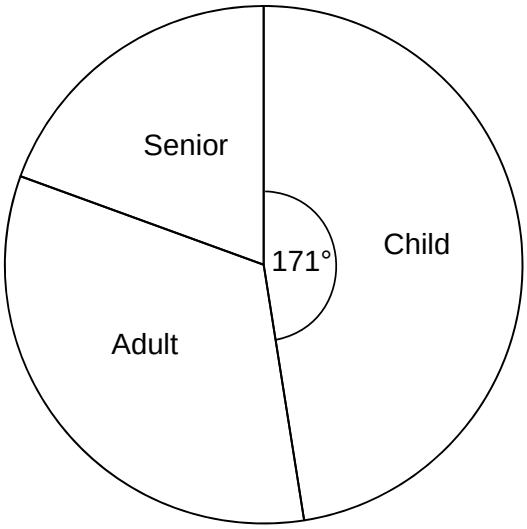
Box A 19 Box B 15 Box C 28

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.

Ticket sales



Not drawn accurately

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

[3 marks]

Senior = x → Adult = $2x$

360° (in a circle) $- 171^\circ = x + 2x$

$189^\circ = 3x$ → $x = 63^\circ$ = Senior

$360^\circ = 800$ tickets

$63^\circ = 140$ tickets

$\div \frac{40}{7}$ $\div \frac{40}{7}$

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

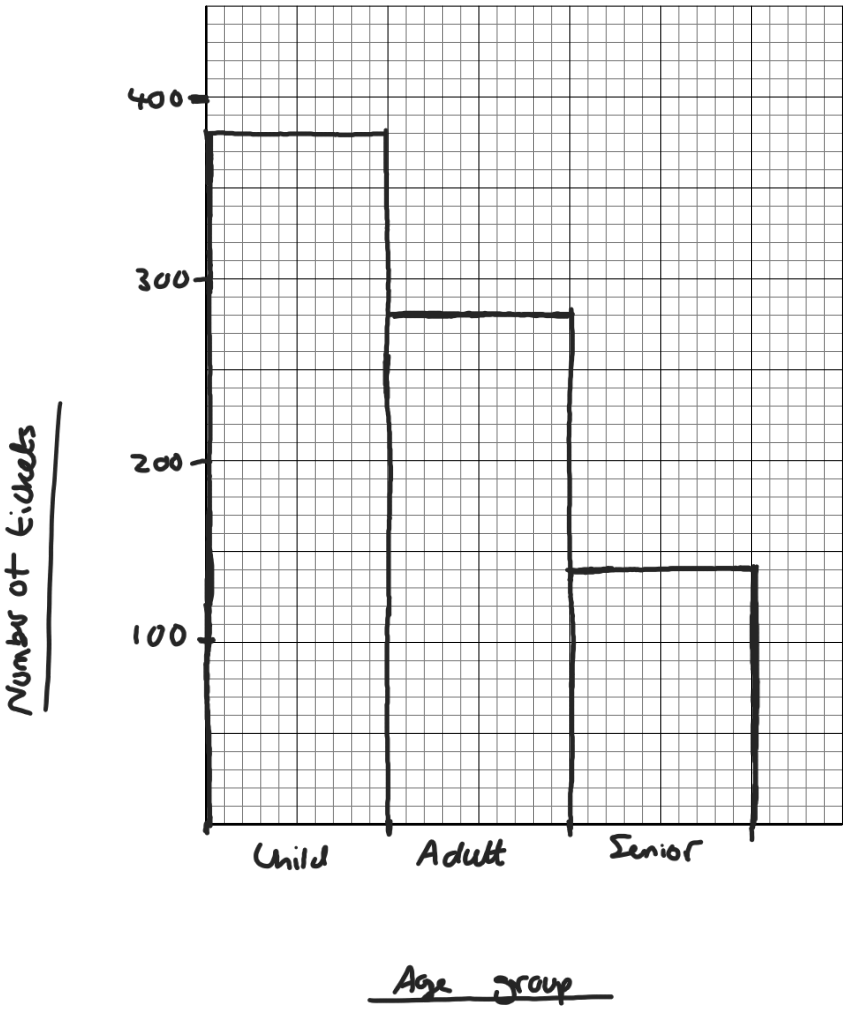
[4 marks]

140 Senior tickets

$140 \times 2 = 280$ adult tickets

$\frac{171}{360} \times 800 = 380$ 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]

$\frac{1000}{42} = 23.8095$

So max 23 cards can be made.

Answer 23

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

[1 mark]

$1000 - (23 \times 42) = 1000 - 966 = 34\text{cm}$

Answer 34 km

14 Luke saves 10p coins and 20p coins.

He has

three times as many 10p coins as 20p coins

a total of £17

How many 10p coins does he have?

[3 marks]

number 10ps = 3 × number 20ps

$\frac{17}{10p+10p+10p+20p} = \frac{17}{50p}$ = 34 coins

34 sets of 3 × 10ps and 1 × 20p

Number of 10p → 3 × 34 = 102 10p coins

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]

$n = 1$

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

$C = 12 + \frac{27}{4}(0)$

$C = 12$

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]

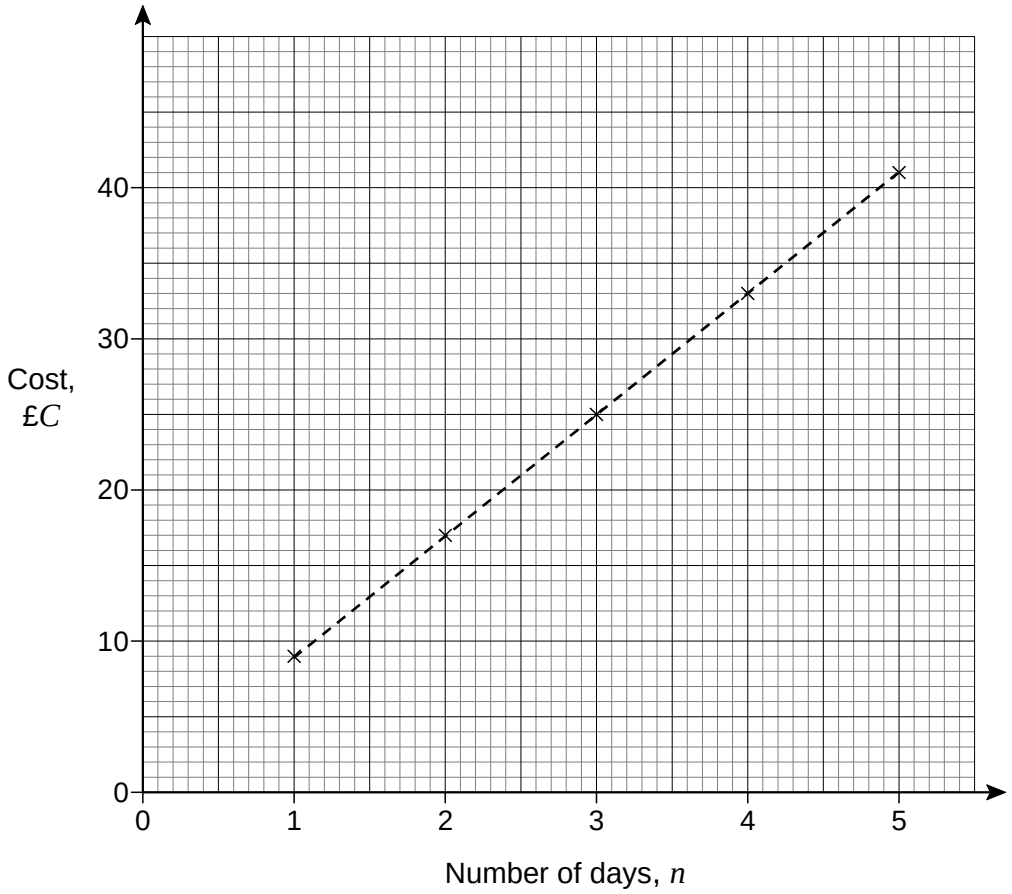
with offer → $7 \times £9 = £63$

No offer → $12 + \frac{27}{4}(7-1)$

$12 + \frac{27}{4}(6) \rightarrow 12 + \frac{81}{2} = £52.5$

No, its not cheaper with the offer.

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]

Use 3 days → $n=3$ $C=£25$ → $25=a+2b$

use 2 days → $n=2$ $C=£17$ → $17=a+b$ → $a=17-b$

$25=a+2b$

$25=17-b+2b$

$25-17=b$

$8=b$

$17=a+8$ → $a=9$

$a =$ 9 $b =$ 8

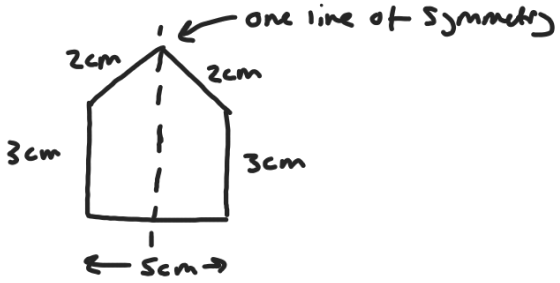
16 A company's logo

- 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]



5 sides so is a pentagon

whole number of sides

Total Perimeter = 15 → 2+2+3+3+5=15

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]

1 week by bus = £19.50

1 week by car = 5 × 24.2 = 121 miles

$121 \div 32.3 = \frac{1210}{323}$ gallons used per week

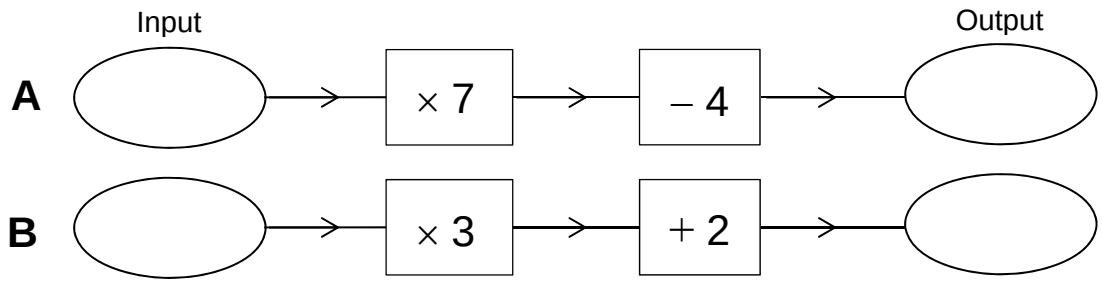
$\frac{1210}{323} \times 4.5 = \frac{5445}{323}$ litres used per week

$£1.27 \times \frac{5445}{323} = £21.41$ per week by car

£21.41 > £19.50 → car > bus → so bus is cheaper

Answer Bus is cheaper

18 Here are two number machines, **A** and **B.**



Both machines have the same input.

Work out the input that makes

the output of **A** three times the output of **B**.

[4 marks]

Input x in both

A → (x × 7) − 4 → 7x − 4

B → (x × 3) + 2 → 3x + 2

$7x - 4 = 3(3x + 2)$

$7x - 4 = 9x + 6$

$-10 = 2x \rightarrow x = -5$

Answer -5

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]

$\frac{10000}{400} = 25$ minutes

No, the time will be longer because he wont be able to run the whole 10000 metres at the same pace as the 400 metres.

20 Which sequence is a geometric progression?

Circle your answer.

[1 mark]

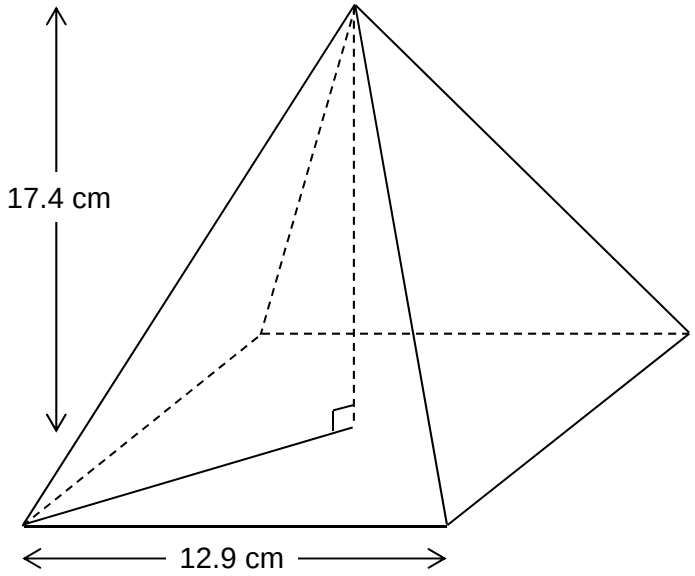
1 2 3 4

1 2 4 7

1 2 4 8 (×2 ×2 ×2)

1 2 3 5

21 This pyramid has a square base.



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

Work out the volume of the pyramid.

[3 marks]

$1/3 \times (12.9 \times 12.9) \times 17.4 = 965.178\ cm^3$

Answer 965.178 cm^3

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

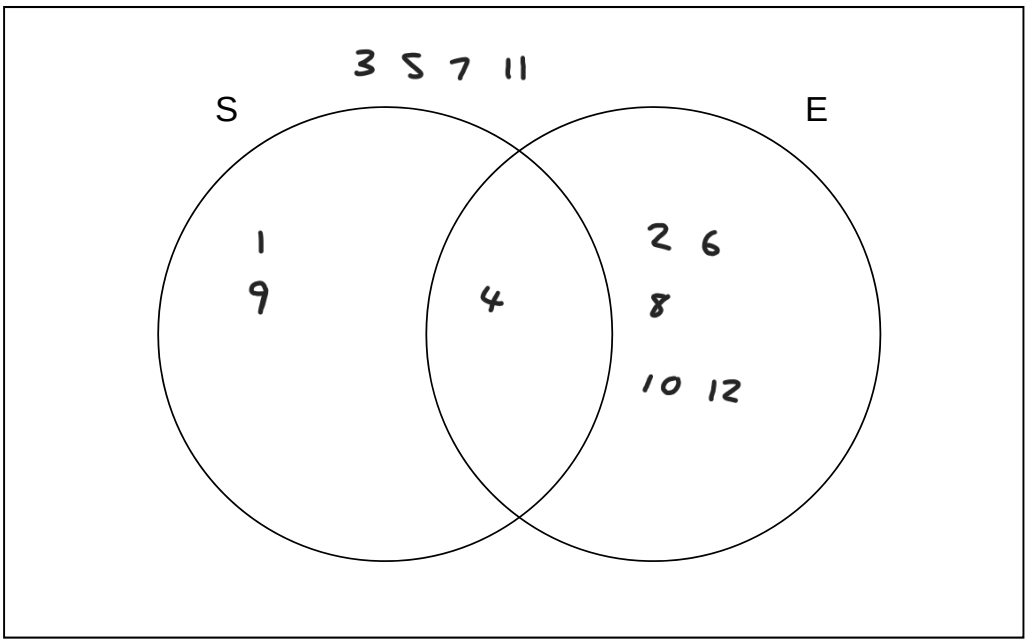
S = square numbers

E = even numbers

22 (a) Complete the Venn diagram.

[3 marks]

ξ



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

Write down $P(S \cap E)$

[1 mark]

Out of 12 numbers only 1 is square and even

Answer 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]

$\frac{6}{6+44} \rightarrow \frac{6}{50}$

$\frac{28}{28+72} \rightarrow \frac{28}{100}$

Answer 6/50 and 28/100

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

[1 mark]

Answer 28/100

Reason Because more trials were involved in calculating this probability

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]

So reduced by 1/5 = 20%

Now its 80% of original price.

£29.40 = 80%

£3.675 = 10%

£36.75 = 100%

Answer £ 36.75

25 Which of these is **not** used to prove that triangles are congruent?

Circle your answer.

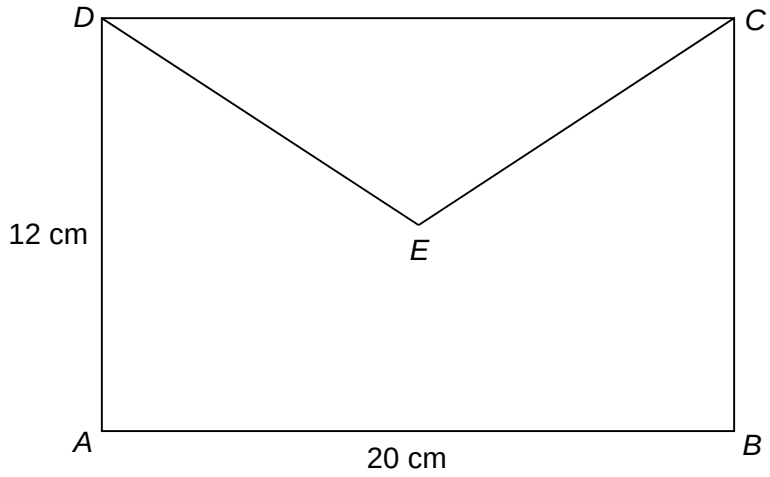
[1 mark]

SSS SAS AAA RHS

Turn over for the next question

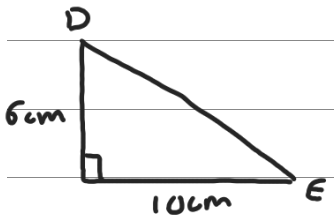
26 *E* is the centre of rectangle *ABCD*.

Not drawn accurately



Work out the length *DE*.

[3 marks]



$6^2 + 10^2 = DE^2$

$36 + 100 = DE^2$

$136 = DE^2$

$DE = \sqrt{136} = 2\sqrt{34}$ cm

Answer $2\sqrt{34}$ cm

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

[1 mark]

$y = 2x - 5$ $\quad$ $y = 5x + 2$ $\quad$ $y = 3x - 2$ $\quad$ $y = -\frac{1}{5}x - 2$

5x because same gradient of 5.

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]

B : G
9 : 7 → Boys have 9 − 7 = 2 more parts in the ratio

These 2 parts = 116 → $\frac{116}{2} = 58$ = students in each part.

Total parts → 9 + 7 = 16 → 16 × 58 = 928 total students

Answer 928

29 Circle the equation with roots 4 and −8

[1 mark]

$4x(x - 8) = 0$

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

$x^2 - 32 = 0$

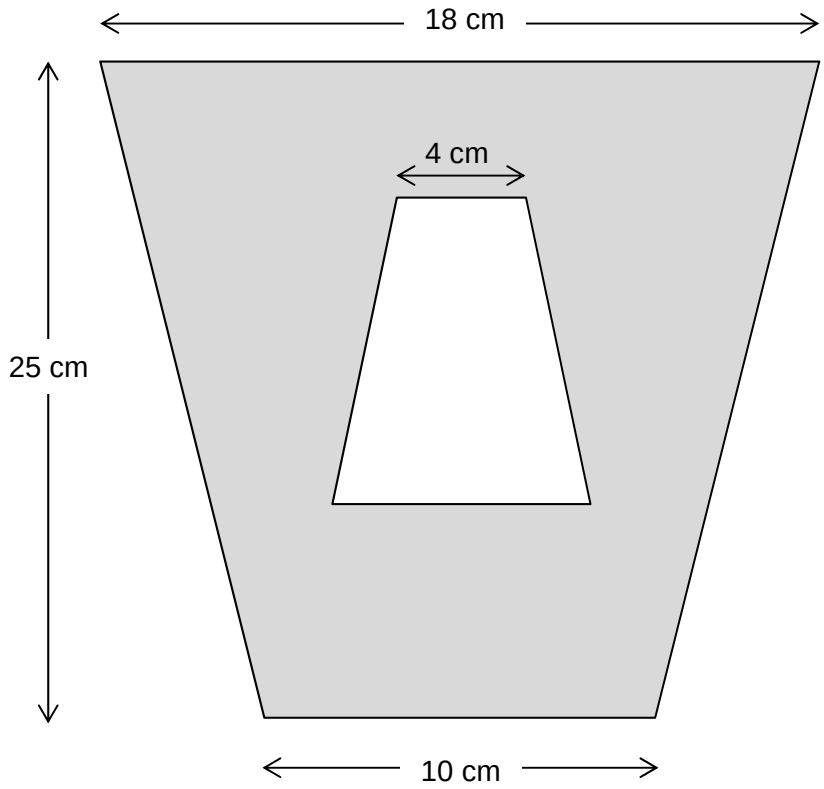
$(x + 4)(x - 8) = 0$

$(x-4)=0$ → $x = 4$

$(x+8)=0$ → $x = -8$

30 A pattern is made from two **similar** trapeziums.

Not drawn accurately

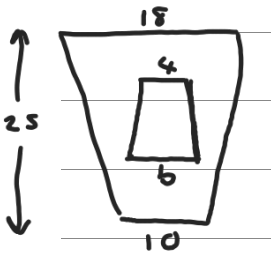


Show that the shaded area is 294 cm^2

[4 marks]

Area large trapezium − Area small trapezium = Shaded area

Large trapezium area = $\frac{18+10}{2} \times 25 = 350\ cm^2$



$4/10 = b/18$

$b = 18 \times \frac{4}{10} = 7.2\ cm$

$\frac{h}{25} = \frac{4}{10}$ $h = 25 \times \frac{4}{10} = 10\ cm$

Area of small trapezium → $\frac{4+7.2}{2} \times 10 = 56\ cm^2$

END OF QUESTIONS

Shaded Area = 350 − 56 = 294 cm^2