

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

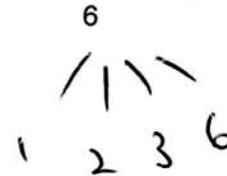
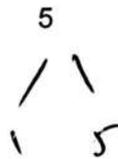
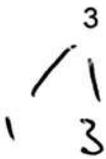
19

26

30

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

[1 mark]



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

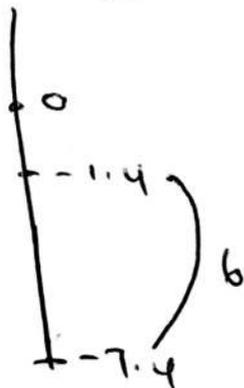
[1 mark]

-8.4

-7.4

-2.0

4.6



4

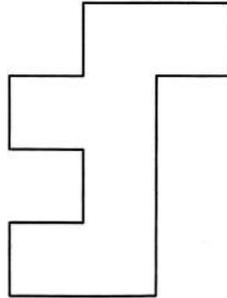
Which shape is congruent to shape X?

Circle the correct letter.

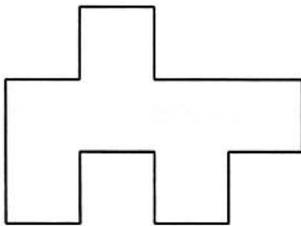
Same

[1 mark]

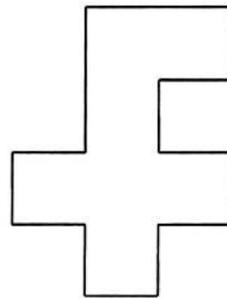
X



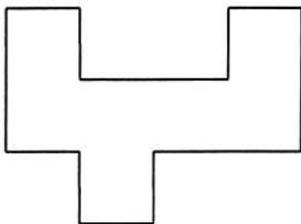
A



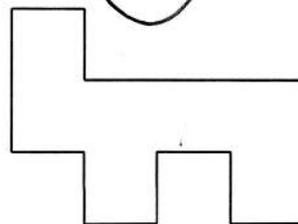
B



C

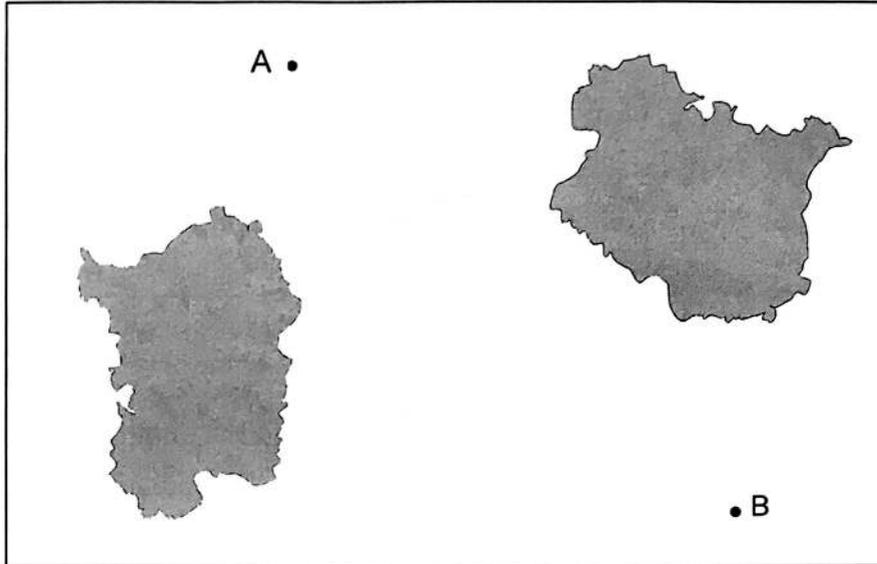


D



- 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]

$$8.5 \times 2.5 = 21.25$$

$$(20-22)$$

Answer 21.25 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]

Bronze 40% of 275

$$\begin{array}{r} 275 \\ \times 40 \\ \hline 1100 \end{array}$$

110

Silver 28% of 275

$$\begin{array}{r} 275 \\ \times 28 \\ \hline 2200 \\ 5500 \\ \hline 7700 \end{array}$$

77

Answer Gold 88.

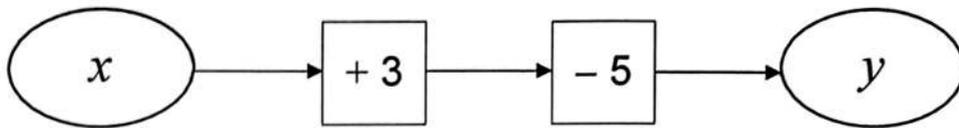
Gold

$$\begin{array}{r} 110 + \\ 77 \\ \hline 187 \end{array}$$

$$\begin{array}{r} 275 - \\ 187 \\ \hline 88 \end{array}$$

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."

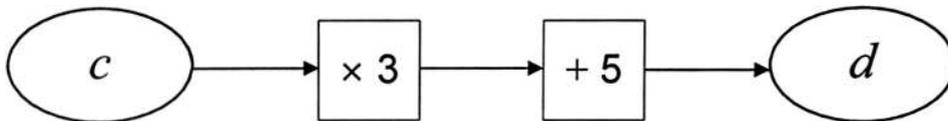
Does this method work?

Give a reason for your answer.

[1 mark]

Yes, because 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 order matters

8 (a) Solve $5w - 11 = 24 + 11$ [2 marks]

$$\begin{array}{r} 5w = 35 \\ \hline \div 5 \quad w = 7 \end{array}$$

$w = 7$

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]

$$\text{£}T = 15x + 12y$$

Answer $\text{£}T = 15x + 12y$

8 (c) Simplify $\underline{x+x} + \underline{y \times y}$ [1 mark]

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.

multiple of 3 + multiple of 2

[1 mark]

$$6 + 4 = 10$$

$$15 + 4 = 19$$

Incorrect - odd or even answer.

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.

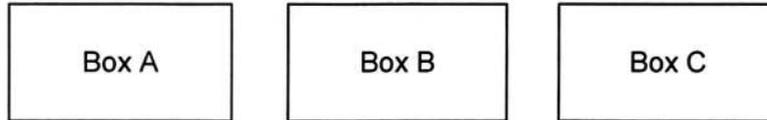
[2 marks]

$$\text{weekly } 9.20 \times 24 = 220.80$$

$$\text{yearly } 48 \times 220.80 = 10598.40$$

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]

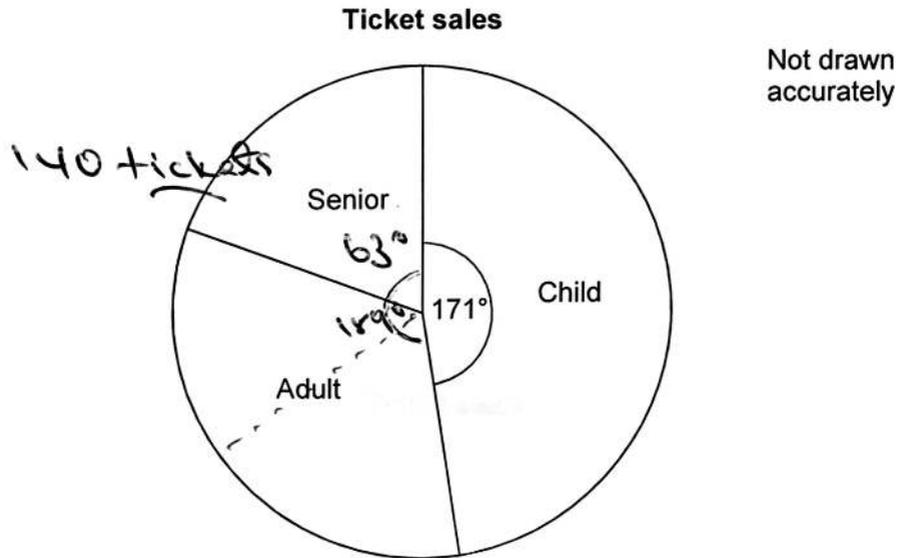
$$\begin{array}{r}
 A + B + C = 62 \\
 - 34 \\
 \hline
 \underline{19} \quad \underline{15} \quad \underline{28}
 \end{array}$$

$\begin{array}{r}
 62 \\
 - 34 \\
 \hline
 28
 \end{array}$

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.



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

[3 marks]

$$\frac{800}{360} = 2.2 \text{ per ticket}$$

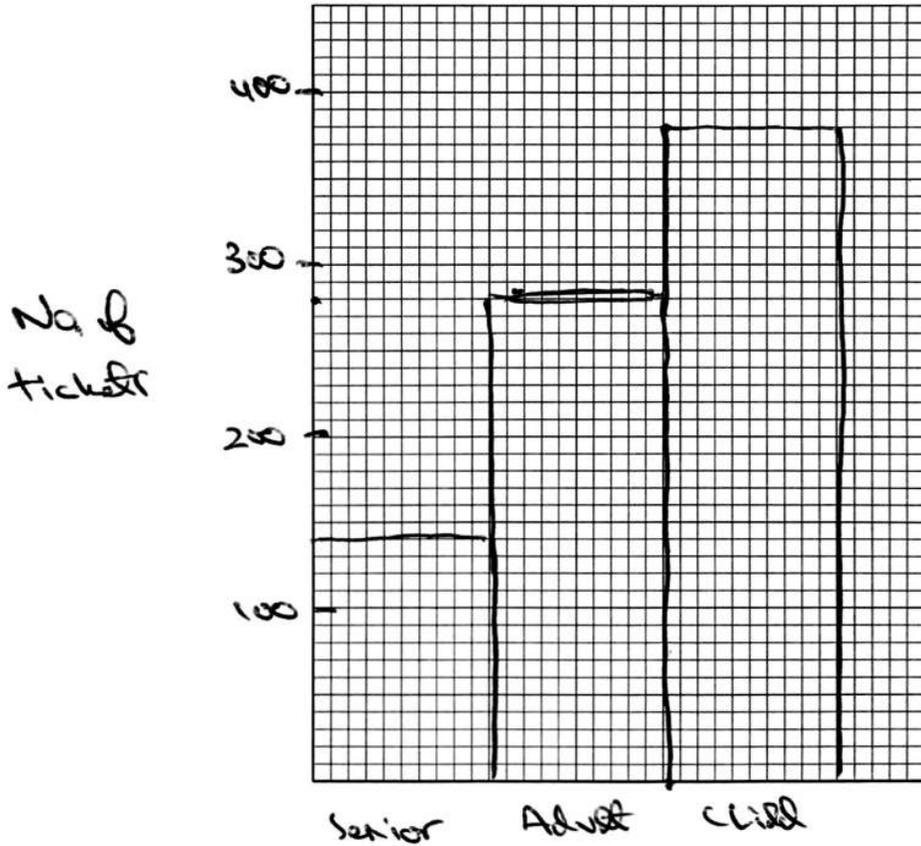
$$3 \overline{) 189} = 63 \times 2.2 = \underline{\underline{140}} \text{ (Senior)}$$

$\begin{array}{r} 800 - \\ 140 \cdot \\ \hline 660 - \\ 280 \cdot \\ \hline 380 \end{array}$	$\begin{array}{r} 280 \text{ (Adult)} \\ \hline 380 \text{ (Child)} \\ \hline 800 \end{array}$
--	--

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

[4 marks]

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]

$$1000 \div 42 = 23.809523$$

Answer 23

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

[1 mark]

Answer 0.809523 cm

14 Luke saves 10p coins and 20p coins.

He has

$\left\{ \begin{array}{l} \text{three times as many 10p coins as 20p coins} \\ \text{a total of } \pounds 17 = 1700 \end{array} \right\}$

How many 10p coins does he have?

[3 marks]

$$\begin{array}{r}
 \begin{array}{cc}
 10p & 20p \\
 \times 3(& \\
 \hline
 30p & \\
 \times 34 & \\
 \hline
 1020p & 680 = 1700p \\
 \hline
 102 \times 10p \text{ coins} &
 \end{array}
 \end{array}$$

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]

Special offer $7 \times 9 = \text{€}63$

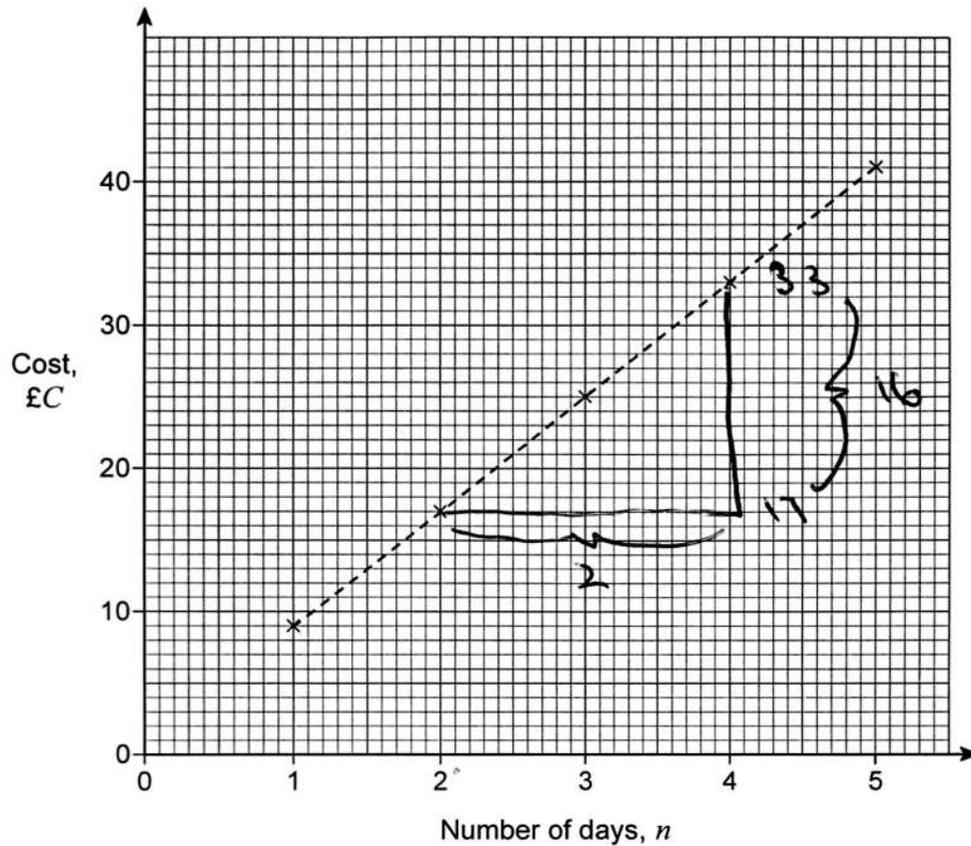
Formula $\Rightarrow C = 12 + \frac{27}{4}(6)$

$= 12 + 40.50$

$= \text{€}52.50$

cheaper normal price.

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]

$$C = 9 + b(n - 1)$$

$$\text{gradient} = \frac{\text{diff } y}{\text{diff } x} = \frac{16}{2} = 8$$

$$a = 9 \qquad b = 8$$

$$C = 9 + 8(n - 1)$$

16 A company's logo



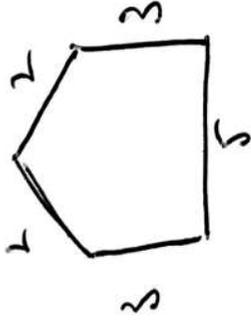
5 sides

- 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]

$$\text{Weekly mileage} = 24.2 \times 5 = 121$$

$$\text{No. of gallons} = \frac{121}{32.3} = 3.746130031 \text{ gallons}$$

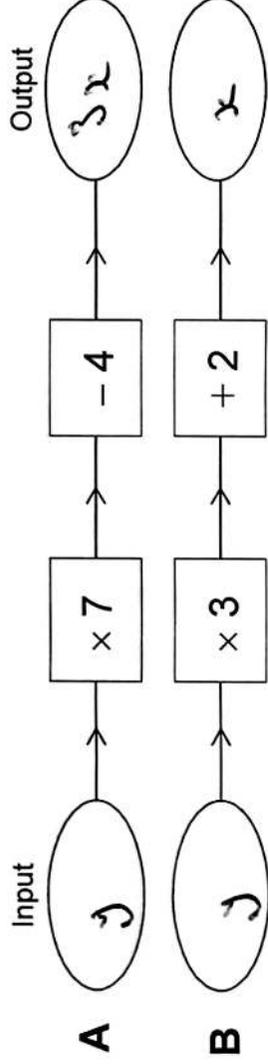
$$= 16.85758514 \text{ litres}$$

$$\text{Fuel} = 16.85758514 \times 1.27$$

$$= £21.41$$

Answer cheaper to use bus

- 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]

$$7y - 4 = 3x \quad -4 = 3x - 7y$$

$$3y + 2 = x \quad 2 = x - 3y$$

$$\begin{array}{r} 3x - 7y = -4 \\ x - 3y = 2 \\ \hline 3x - 9y = 6 \\ \hline 2y = -10 \\ y = -5 \end{array}$$

Answer -5

check $(-5 + 7) - 4 = -39$

$$(-5 \times 3) + 2 = -13 \quad) \times 3$$

- 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

60000

Yes, the time will be 25 minutes

No, the time will be shorter

Give working and a reason to support your answer.

[2 marks]

$$\frac{400 \text{ m}}{1 \text{ min}} \times 25 = 10,000$$

- 20 Which sequence is a geometric progression?
Circle your answer.

[1 mark]

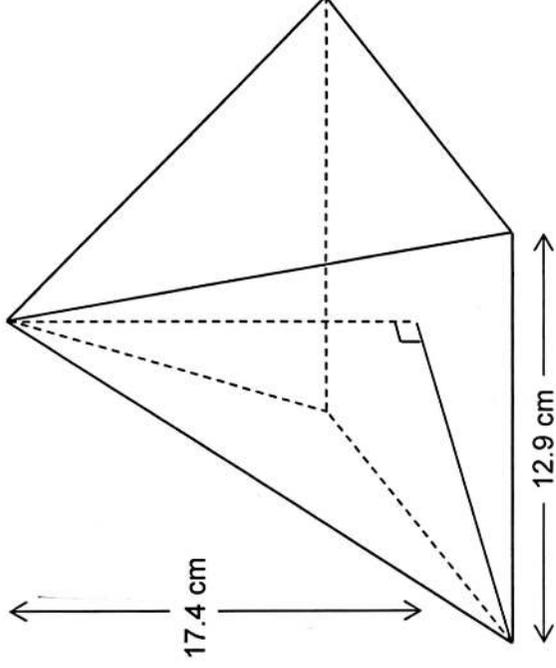
1 2 3 4

1 2 4 7

1 2 4 8
2x2, 2x2, 2x2

1 2 3 5

- 21 This pyramid has a square base.



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

Work out the volume of the pyramid.

[3 marks]

$$\text{Vol} = \frac{1}{3} \times (12.9 \times 12.9) \times 17.4$$

$$= 965.178$$

Answer 965.18 cm³
288.

22

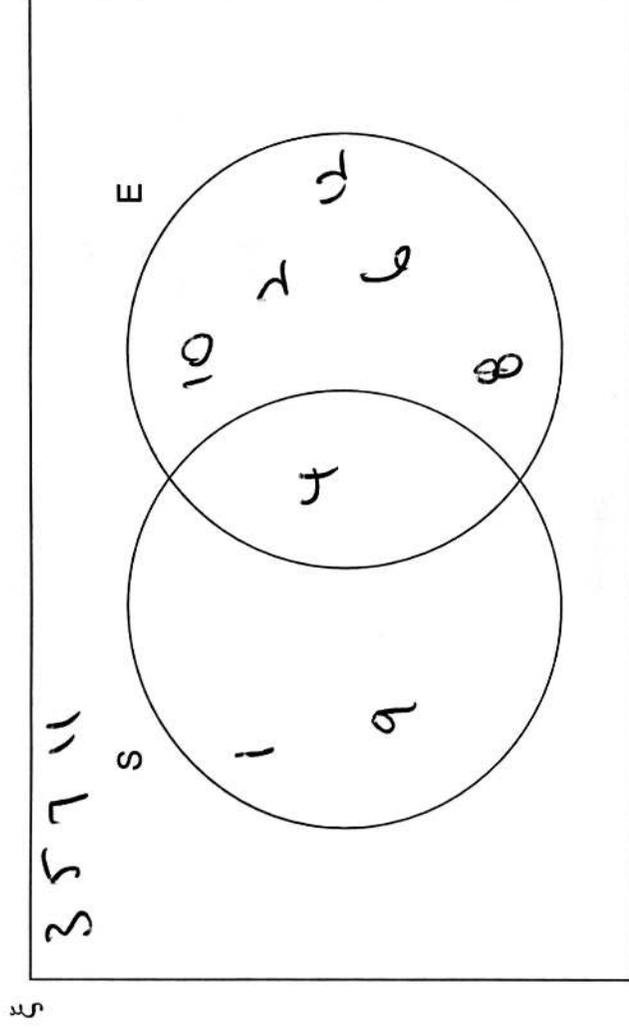
$$\xi = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$$

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]

$$\frac{1}{12} - \text{one number}$$

Answer

$$12 - \text{twelve in total}$$

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]

Meera $\frac{6}{50}$

John $\frac{28}{100}$

Answer $\frac{4}{50}$ and $\frac{28}{100}$

23 (b) Which of your estimates is the better estimate for the probability of winning?

Give a reason for your answer.

[1 mark]

Answer $\frac{28}{100}$

Reason Larger sample

24

In a sale, the original price of a bag was reduced by $\frac{1}{5}$ (20%).
The sale price of the bag is £29.40

Work out the original price.

[3 marks]

$$29.40 = 80\% \text{ Normal}$$

$$29.40 = 0.8 N$$

$$\frac{29.40}{0.8} = N$$

$$36.75 = N$$

Answer £ 36.75

25

Which of these is not used to prove that triangles are congruent?
Circle your answer. — same

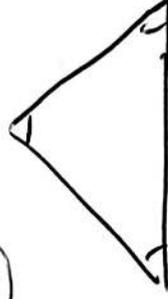
[1 mark]

SSS

SAS

AAA

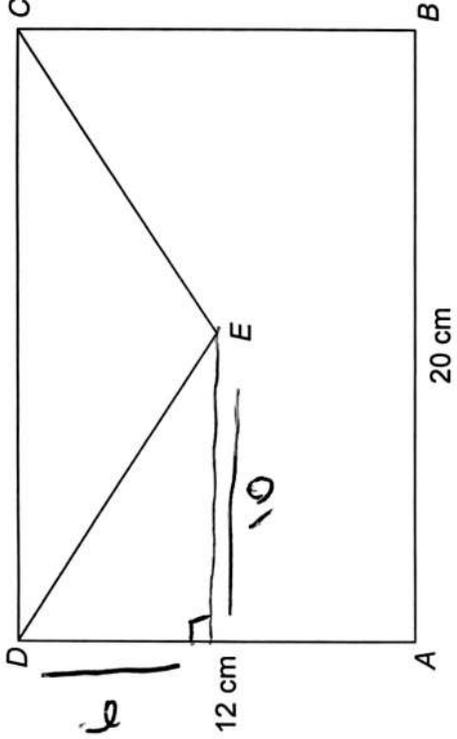
RHS



Turn over for the next question

26 E is the centre of rectangle ABCD.

Not drawn accurately



Work out the length DE.

[3 marks]

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

$$= 36 + 100$$

$$DE = \sqrt{136}$$

$$= 11.661$$

Answer 11.661 (3dp) 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]

$$9 : 7$$

$$9 : 7 \quad 16$$

$$+58 \left(\begin{array}{l} 2 \\ \times 58 \end{array} \right) \times 58$$

$$522 \left(\begin{array}{l} 116 \\ \times 8 \end{array} \right) 406 = 928$$

Answer

928

29

Circle the equation with roots 4 and -8

[1 mark]

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



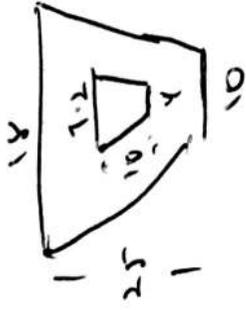
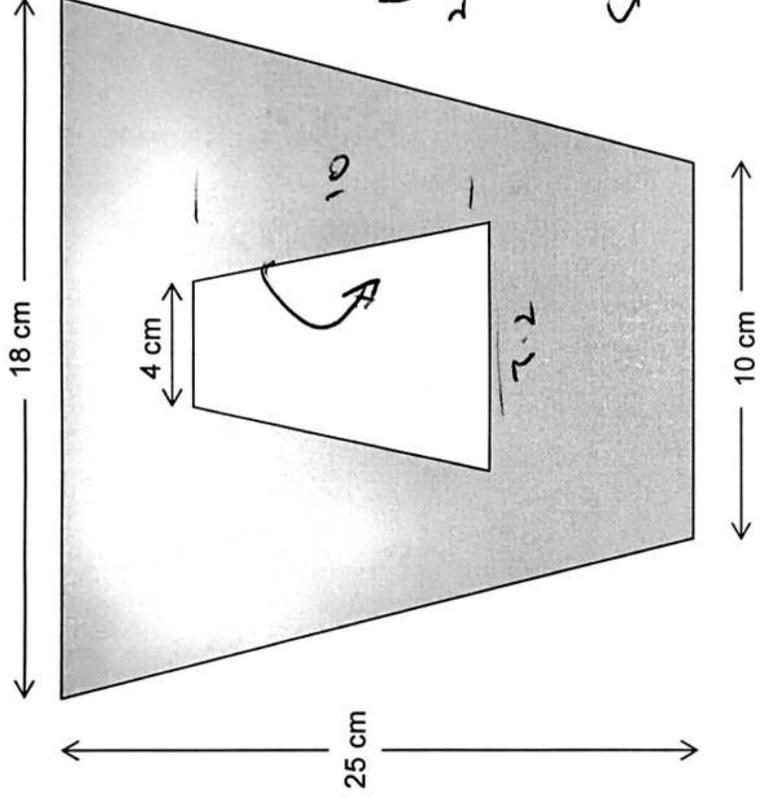
$$(x - 4)(x + 8) = 0$$

$$x^2 - 32 = 0$$

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

- 30 A pattern is made from two similar trapeziums.

Not drawn
accurately



Scale Factor 2.5

Show that the shaded area is 294 cm^2

[4 marks]

$$\text{Area of trapezium} = \frac{1}{2}(a+b)h$$

$$\text{Large} = \frac{1}{2}(18+25)25$$

$$= 350$$

$$\text{Small} = \frac{1}{2}(7.2+4)10$$

$$= 56$$

$$\text{Area} = \text{Large} - \text{Small} = 350 - 56 = \underline{\underline{294 \text{ cm}^2}}$$

END OF QUESTIONS