

1 200 students at a school were asked how they travel to school.

The pictogram shows the results for four of the ways they travel to school.

Walk					40
Bus					75
Cycle					✓
Tram					20
Car			10		30

Key: represents 20 students.

$$\square = 5$$

(a) How many students walk to school?

(a) ..... [1]

(b) How many **more** students travel by car to school than travel by tram to school?

(b) ..... [2]

(c) The rest of the 200 students cycle to school.

Complete the pictogram to show the number of students who cycle to school. [3]

$$200 - (40 + 75 + 20 + 30) = 35 \quad \checkmark$$

(d) The total number of students at the school is 800.

What fraction of the students at the school were asked how they travel to school?  
Give your answer in its simplest form.

$$\frac{200}{800}$$

(d) ..... [2]

2 (a) (i) Write down an odd number.

(a)(i)

1, 3, etc

[1]

(ii) Write down a common multiple of 3 and 17.

(ii)

51, 102 ... etc

[1]

(b) Write 24:60 as a ratio in its simplest form.

12:30 etc ✓

2

5

(b)

[2]

3 Complete this table of fractions, decimals and percentages.

Fraction	Decimal	Percentage
$\frac{1}{5}$	= 0.2	$\times \frac{1}{100}$ 20
$\frac{3}{100}$	= 0.03	= 3%
$\frac{145}{100}$	= 1.45	= 145

[3]

4 Write the following numbers in order of size, smallest first.

0.329 0.3400 0.3041 0.3460

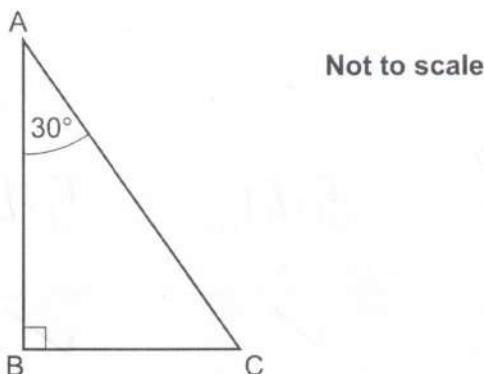
0.3041, 0.329, 0.34, 0.346 ✓

smallest

Turn over

Any 3 = ✓

5 (a) The diagram shows a triangle, ABC.  
The angle at A is  $30^\circ$ .



(i) What does the symbol at angle B mean?  
Choose from this list.

An acute angle

The biggest angle

An obtuse angle

A reflex angle

A right angle

(a)(i)

A right angle

[1]

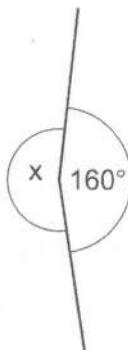
(ii) Work out the angle at C.  
Give a geometrical reason for your answer.

The angle at C is .....  $60^\circ$  because .....

..... angles in a triangle sum to  $180^\circ$

[2]

(b) A student works out the size of angle x in this diagram.



Not to scale

The student says the angle is  $240^\circ$ .

Explain why the student's answer cannot be correct.

$240 + 160 = 400$ , should =  $360^\circ$

6 The circumference of a circle is 17cm.

Calculate the diameter of the circle.  
Give your answer correct to 1 decimal place.

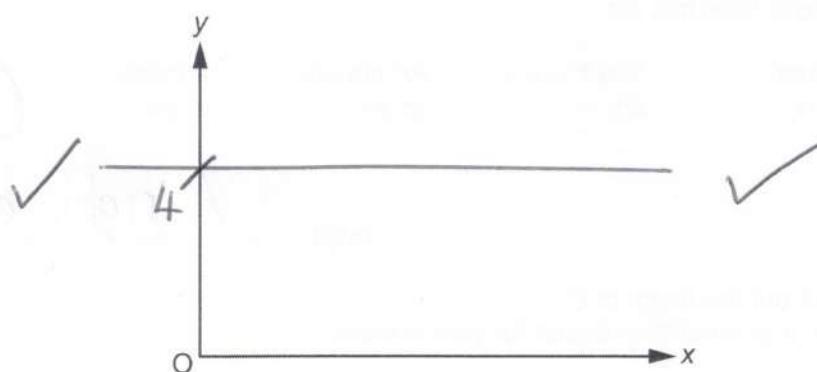
$$C = \pi d$$

$$d = \frac{17}{\pi} = 5.41\dots = 5.4$$

..... cm [3]

✓      ✓      ✓

7 Sketch the graph of  $y = 4$  on the axes below.  
Show clearly the value of any intercepts.



[2]

8 (a) Insert **two** of these symbols  $+$ ,  $-$ ,  $\times$  or  $\div$  to make this calculation correct.

$$5 \times (3 + 1) = 20$$

✓

[1]

(b) Calculate

$$\sqrt{\frac{12.9^2 + 83}{5^2}}$$

Give your answer correct to 3 significant figures.

$$= 3.1585\dots$$

✓✓

$$3.16$$

✓ Turn over

[3]

9 Here is a list of five numbers.

14    2    26    43    9

(a) Find the range.

$$43 - 2$$



(a) ..... = 41 ..... [2]

(b) A sixth number is added to the list.  
The mean of the six numbers is 23.5.

Work out the sixth number.

$$23.5 \times 6 = 141 \text{ total}$$



$$141 - (14 + 2 + 26 + 43 + 9)$$



(b) ..... [3]

$$47$$



10 Simplify.

$$8j + 4k - 10j + 7k$$

$$-2j + 11k$$

[2]



11 A recipe for cookies uses only butter, flour and sugar in the ratio 2:4:1.  
Using this recipe, 160g of butter is needed to make 10 cookies.

Using this recipe, work out how much **flour** is needed to make 25 cookies.

$$\begin{array}{ccc}
 & B & F & S \\
 & 2 & 4 & 1 \\
 \times 80 & \swarrow & \downarrow & \nearrow \\
 160 & & 320g & \\
 & & \checkmark & \\
 & & 10 & \xrightarrow{x2.5} 25 \\
 & & \checkmark & \checkmark
 \end{array}$$

$$320 \times 2.5 = 800g$$

g [3]

12 The deposit for a holiday is  $\frac{2}{7}$  of the total cost.

A customer pays a deposit of £618.

Calculate the total cost of the holiday.

$$\begin{array}{l}
 \frac{2}{7} = 618 \\
 \div 2 \quad \checkmark \\
 \times 7 \quad \frac{1}{7} = 309 \\
 \frac{7}{7} = 2163
 \end{array}$$

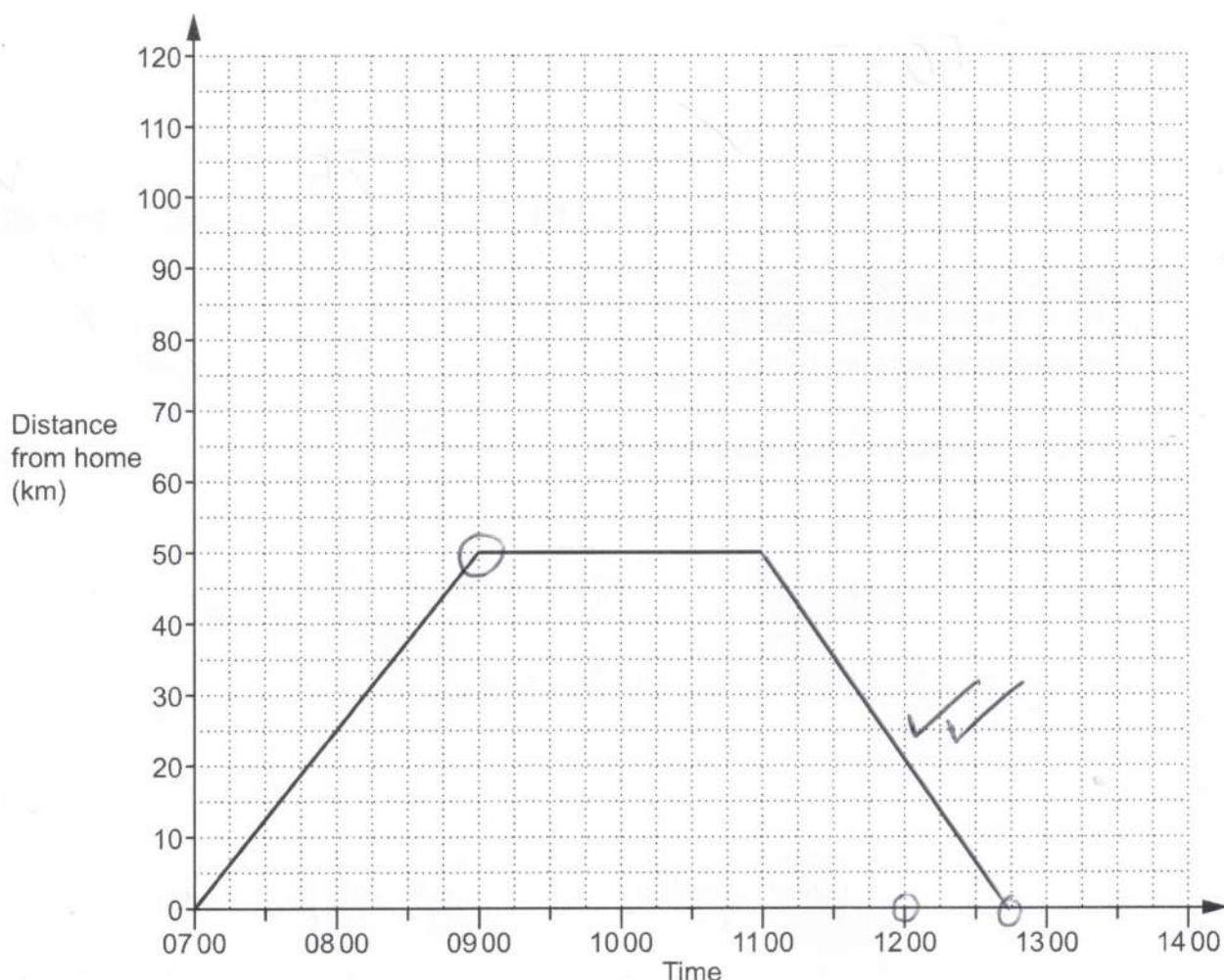
$$\begin{array}{r}
 2163 \\
 \hline
 \end{array}$$

£ ..... [3]

Turn over

13 Zayn drives from home to a shopping centre.

The graph shows information about the journey and the time spent at the shopping centre.



(a) State an assumption that has been made when the graph was drawn.

Drives at a constant speed

✓

[1]

(b) Write down the distance from Zayn's home to the shopping centre.

50  
(b) ..... km [1]

(c) Calculate Zayn's average speed, in km/h, from home to the shopping centre.

$$50 \div 2$$



25



(c) ..... km/h [2]

(d) Zayn leaves the shopping centre at 11 00.

Zayn drives home without stopping.

The journey home takes  $1\frac{3}{4}$  hours.

Complete the graph to show this information.

[2]

14 Five adults and two children go to a theme park.  
 The cost of an adult ticket is £6 more than the cost of a child ticket.  
 The total cost of the seven tickets is £142.

Work out the cost of an adult ticket.  
 You must show your working.

$$C = x$$

$$A = x + 6$$

$$5(x+6) + 2x = 142$$

$$5x + 30 + 2x = 142$$

$$7x = 112$$

$$x = 112 \div 7 = 16$$

$$\text{Adult} = 16 + 6 = 22$$

[5]

15 The cost of sending a child to nursery is £5.80 per hour on each weekday.

On Saturday the cost is  $1\frac{1}{4}$  times the weekday hourly rate.

A child goes to nursery for:

- 6 hours on Wednesday
- 5 hours on Thursday
- 4 hours on Saturday.

The **total cost** for the three days is reduced by 5% as a special offer.

Work out the cost for the three days after the 5% reduction.

You must show your working,

$$\text{Sat} = 5.8 \times 1\frac{1}{4} = 7.25$$

$$\text{Wed} = 5.8 \times 6 = 34.8$$

$$\text{Thu} = 5.8 \times 5 = 29$$

$$\begin{array}{r} \text{Sat} = 7.25 \times 4 = 29 \\ \hline 92.80 \end{array}$$

$$92.80 \times 0.95$$

$$= 88.16$$

£ ..... [6]

16 Leo pays £44.98 for 26 litres of diesel.  
 Mia puts 60 litres of the same diesel into her car.  
 Mia has £103 with which to pay for her diesel.

Does Mia have enough money to pay for her diesel?  
 Show how you decide.

$$44.98 \div 26 = £1.73 \text{ per litre } \checkmark$$

$$1.73 \times 60 = £103.80 \checkmark$$

No ..... because ..... she needs another 80p  $\checkmark$

[4]

17 Factorise fully.

(a)  $6x^2 + 9x$

(a) .....  $3x(2x + 3)$   $\checkmark$  Lee [2]

(b)  $x^2 + 8x + 15$

15, 1

5, 3

(b) .....  $(x+5)(x+3)$   $\checkmark$  [2]

18 (a)  $N$  is a number such that:

- $N = 3 \times 5 \times k$ , where  $k$  is a prime number
- $N$  is greater than 400.

Find the smallest possible value of  $N$ .

$$3 \times 5 \times 19 = 285 \quad \times$$

$$3 \times 5 \times 23 = 345 \quad \times$$

$$3 \times 5 \times 29 = 435 \quad \checkmark$$

Any ✓  
 $K=29$  ✓✓  
 435 ✓✓✓

(a)  $N = \dots \quad [3]$

(b)  $a$  and  $b$  are different prime numbers.

Explain why  $a \times b$  is not a prime number.

Because  $a$  and  $b$  would be factors

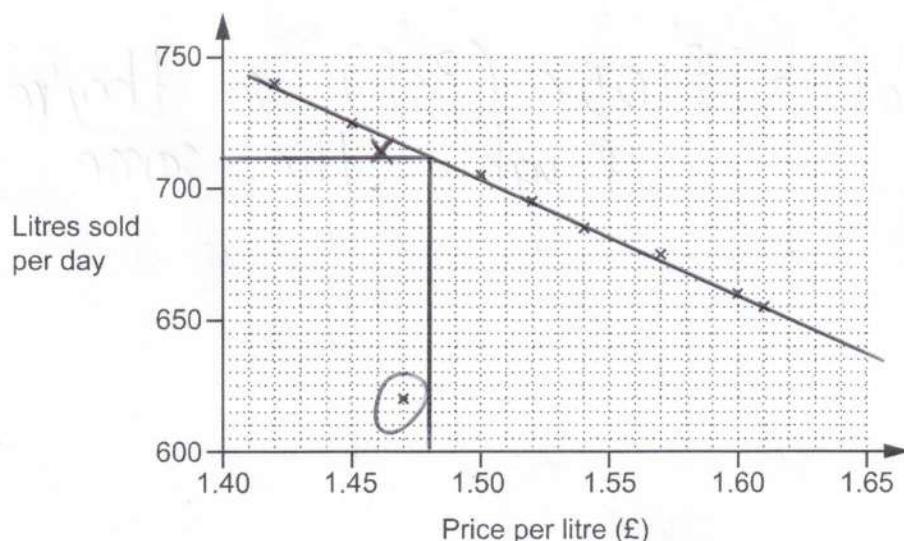
[1]

19 Each week the manager of a petrol station records the average daily sales, in litres, and the average price, in pounds, of a litre of petrol for that week.

The table shows their results for ten weeks.

Week	1	2	3	4	5	6	7	8	9	10
Price per litre (£)	1.42	1.45	1.47	1.50	1.54	1.60	1.57	1.52	1.61	1.46
Litres sold per day	740	725	620	705	685	660	675	695	655	715

The results for the first nine weeks are plotted on the scatter diagram.



(a) Plot the result for week 10. ✓

[1]

(b) Describe the type of correlation shown in the scatter diagram.

(b) .....

Negative

✓ [1]

(c) In one week, there was a delay with petrol deliveries.

✓ [1]

Circle the most likely point on the scatter diagram for that week.

(d) (i) On the scatter diagram, draw a line of best fit.

✓ [1]

(ii) Use the line of best fit to estimate the average daily sales when the price per litre of petrol is £1.48.

(d)(ii) .....

712 litres [1]

(accept any from good lots)

(e) The manager says,

As the sales go down, the total amount of money we take stays roughly the same.

Find evidence to support this statement.

$$\text{WK 2} \Rightarrow 725 \times 1.45 = £1051.25$$

$$\text{WK 9} \Rightarrow 655 \times 1.61 = £1054.55$$

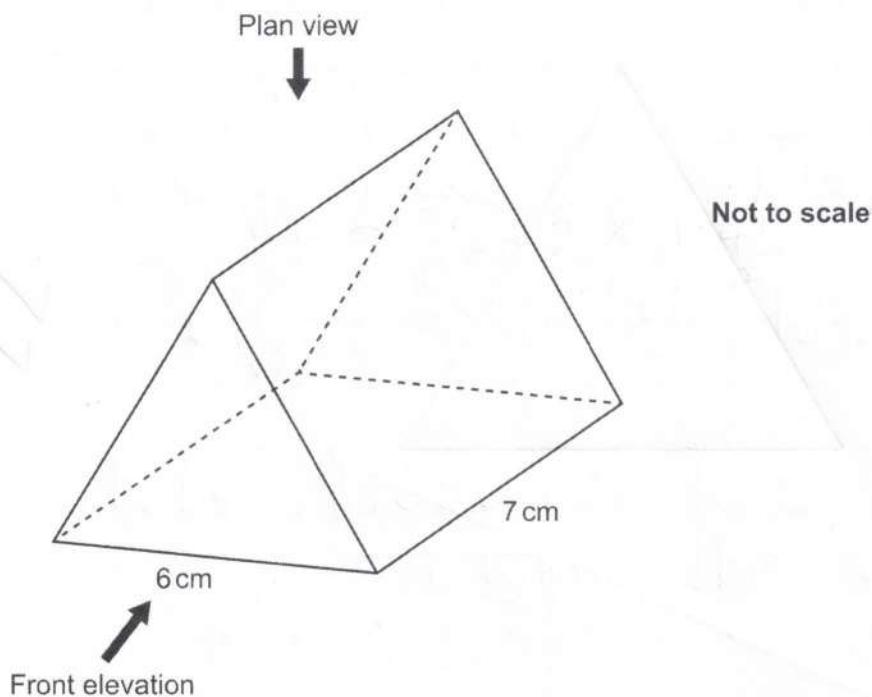
✓ Any

Both = £1050 (3sf) so they're roughly the same

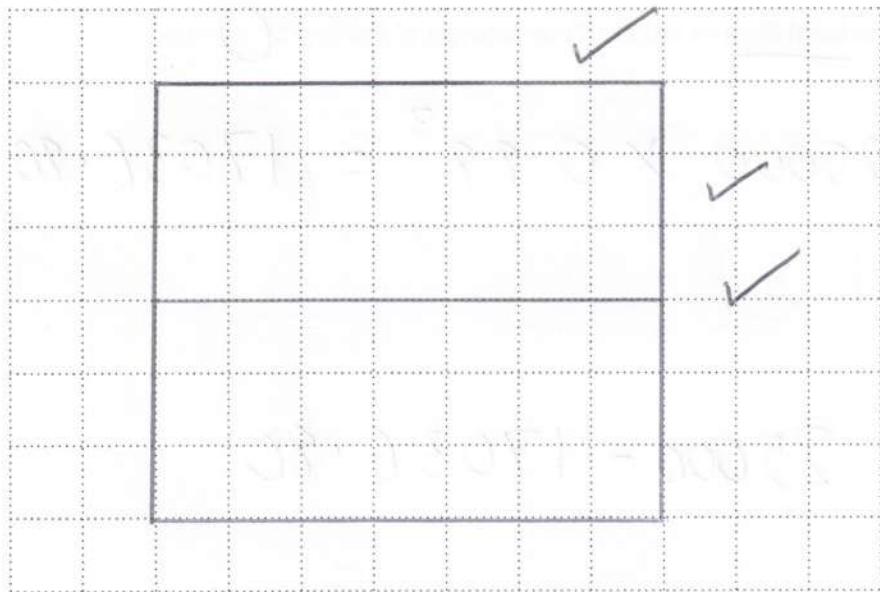
[3]

20 The diagram shows an equilateral triangular prism.

Each side of the equilateral triangle is 6 cm and the length of the prism is 7 cm.



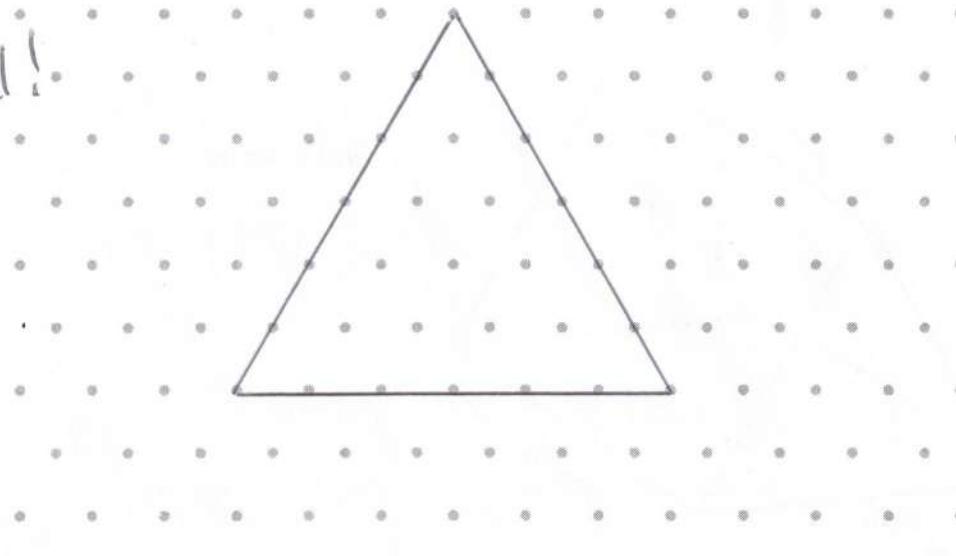
(a) Draw an accurate plan view of the prism on the one-centimetre square grid below.



[3]

(b) Draw an accurate front elevation of the prism on the one-centimetre isometric grid below.

equilateral!



✓ size  
✓ shape

[2]

21 At the start of 2020, the value of a particular caravan was £25 000. The value of the caravan then decreased by 12% each year.

Calculate the total loss in value of the caravan at the end of 3 years.

$$25000 \times 0.88^3 = 17036.80$$

$$25000 - 17036.80$$

$$= 7963.20$$

£ ..... [4]

22 The width,  $w$ , of a car parking space is 2.8 metres, correct to 1 decimal place.

Complete the error interval for the width,  $w$ .

$$2.75 \leq w < 2.85 \quad [2]$$

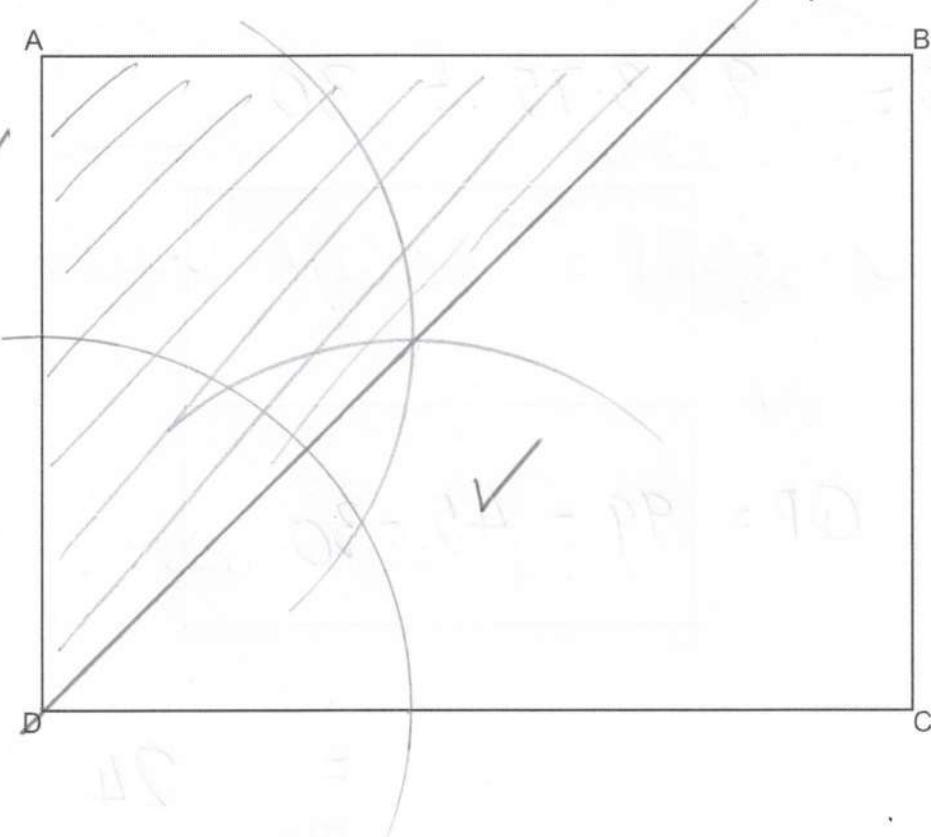
23 Force is measured in newtons (N).

A force of 140 N is applied to a surface of area 8 cm<sup>2</sup>.

Work out the pressure, in N/cm<sup>2</sup>, applied to this surface.

$$P = \frac{F}{A} = \frac{140}{8} \quad \checkmark \quad 17.5 \quad \checkmark \quad \text{N/cm}^2 \quad [2]$$

24 The diagram shows a rectangular garden ABCD.

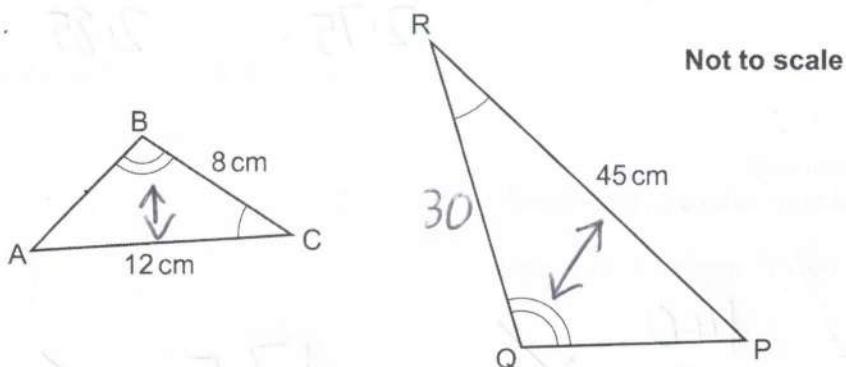


The region of the garden that is closer to DA than DC is to be made into a patio.

Construct and shade the region for the patio.  
Show all your construction lines.

[3]

25 Triangles ABC and PQR are mathematically similar.  
 Angle ACB = Angle PRQ.  
 Angle ABC = Angle PQR.



The perimeter of triangle PQR is 99 cm.

Find the length of PQ.

$$\text{scale factor} = 45 \div 12 = 3.75 \quad \checkmark$$

$$RQ = 8 \times 3.75 = 30 \quad \checkmark$$

$$QP = 99 - 45 - 30$$

$$= 24 \quad \checkmark$$

PQ = ..... cm [4]

END OF QUESTION PAPER