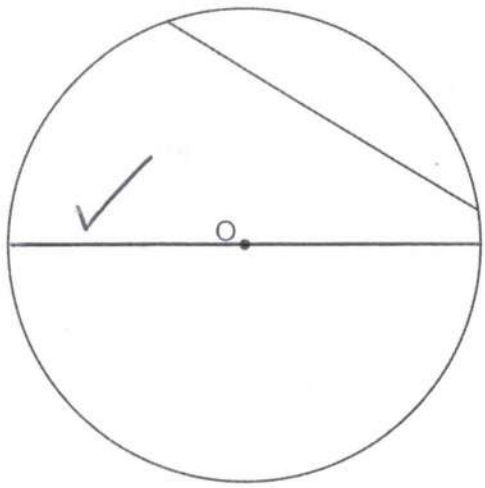
OCR-F | Summer '25 | 3

1 The diagram shows a circle, centre O, and a straight line.



(a) Write down the mathematical name for

(i) the straight line

(a)(i) chord ✓ [1]

(ii) the perimeter of the circle.

(ii) circumference ✓ [1]

(b) On the diagram, draw a diameter. [1]

2 **(a)** **(i)** Round 4352 to the **nearest hundred**.

(a)(i) 4400 ✓ [1]

(ii) Round £5.3725 to the **nearest penny**.

(ii) £ 5·37 ✓ [1]

(b) A decorator works out how much to charge for some painting.

The decorator
- rounds **up** the area to be painted to the next $10\,m^2$
- then charges £65 for every $10\,m^2$.

Work out how much the decorator charges for painting an area of $74\,m^2$.

74 → 80

8 x 65 ✓

520 ✓

(b) £ [2]

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3 **(a)** Write $5 \times 5 \times 5 \times 5 \times 5 \times 5$ as a power of 5.

5^6 ✓

(a) ..... [1]

(b) Write down the value of 1^{10}.

1 ✓

(b) ..... [1]

(c) Work out.

$4 \times 4 \times 4 - 3^3$

64 - 27 ✓

37 ✓

(c) ..... [2]

4 **(a)** Write 1% as a decimal.

÷100

0.01 ✓

(a) ..... [1]

(b) Write 35% as a fraction.
Give your answer in its simplest form.

$\frac{35}{100}$ ✓ $\frac{7}{20}$ ✓

(b) ..... [2]

(c) Work out 15% of 2 litres.
Give your answer in millilitres.

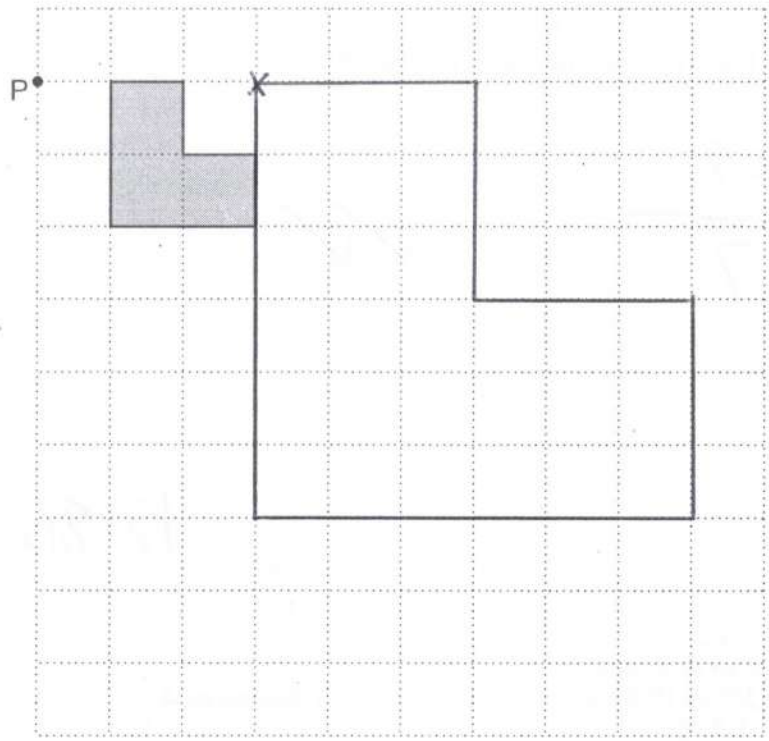
$\frac{15}{100} \times 2 \times 1000$ ✓✓

300 ✓

(c) .....ml [3]

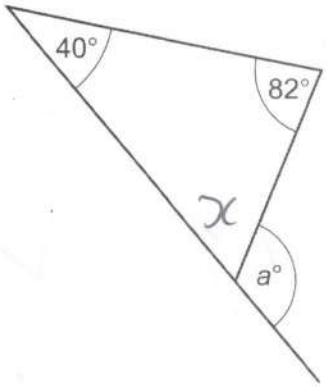
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5 Enlarge the shaded shape with scale factor 3 and centre of enlargement at point P.



[2]

6 **(a)** The diagram shows a triangle with one side extended.



Not to scale

$x = 180 - (82 + 40)$

$= 58$

Work out the value of a.

$180 - 58$

(a) $a =$ 122 **[2]**

(b) Complete the statement below using the correct symbol and value from this list.

$< 90°$ $= 90°$ $> 90°$ $< 180°$ $= 180°$ $> 180°$

When the two smallest angles in a triangle are added the answer is always < 180 **[1]**

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7 A shop assistant works for 7 hours each day for 5 days.
The shop assistant is paid the same amount for each hour they work.
In the 5 days, the shop assistant earns £448.

How much does the shop assistant earn per hour?

$\frac{448}{5 \times 7}$ ✓✓

£ 12·80 ✓ [3]

8 (a) A student thinks of a number.
The student takes 16 from the number and then divides by 4.
The answer is 8.

What number is the student thinking of?

$\frac{x-16}{4} = 8$ ✓

$x - 16 = 32$

(a) 48 ✓ [2]

(b) A teacher thinks of a number.
150% of the number is 36.

What number is the teacher thinking of?

50% = 12 ✓

x 2

(b) 24 ✓ [2]

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9 Sam sees a computer tablet for sale on the internet for 126 euros (€).
Sam has £105 to spend.

The exchange rate is £1 = €1.15.

Can Sam buy the tablet?
Show how you decide.

$105 \times 1.15 = €120.75$ ✓

NO ✓ because needs €5.25 more

[2]

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10 **(a)** This is a function machine.



(i) Find the output when the input is 10.

$\frac{15}{2}$

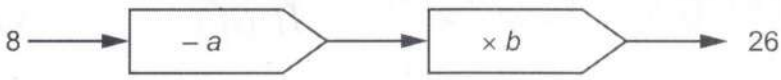
(a)(i) 7.5 ✓ ..... **[1]**

(ii) Find the input when the output is 24. $\times 2 = 48$ ✓

$48 - 5 =$ 43 ✓

(ii) ..... **[2]**

(b) This is a different function machine.



a and *b* are both positive integers.
When *a* is 7 the value of *b* is 26.

Find another pair of values for *a* and *b*.

Factors of 26 ~~1, 26~~

~~2,~~ (13) ✓

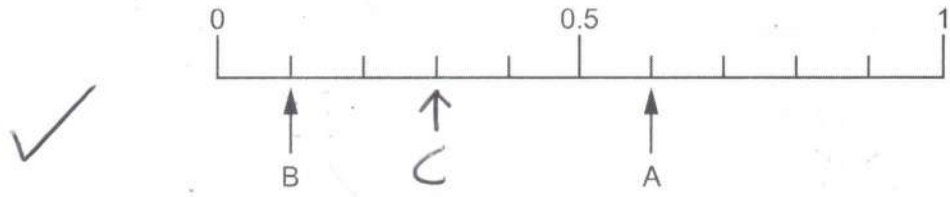
(b) *a* = 6 ✓

b = 13 ✓ **[3]**

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11 A student has a three-sided spinner with sides labelled A, B and C.
They spin the spinner a number of times and record the results.

The student works out the correct relative frequencies for the spinner landing on sides A and B.
The relative frequencies are shown on this scale.



(a) Write down the relative frequency that the spinner landed on side A.

0.6 ✓OE

(a) ..... **[1]**

(b) **(i)** The student then works out the relative frequency that the spinner landed on side C is 0.4.

Explain, using a calculation, why the relative frequencies show that the student has made a mistake.

$0.6 + 0.4 + 0.1 = 1.1$ ✓

cannot > 1 ✓

.....

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

(ii) On the scale above, mark with an arrow (↑) the **correct** relative frequency that the spinner landed on side C. **[1]**

(c) The student says

The **probability** that the spinner will land on side B on my next spin is 0.1.

What assumption is the student making?

Sample was large ✓etc

.....

..... **[1]**

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12 The diagram shows a large rectangle made from 10 smaller rectangles of equal area.
The large rectangle is divided into two unequal parts, A and B.



3 7

(a) Tick (✓) all the correct statements.

A : B = 3 : 10	
A : B = 3 : 7	✓
A is $\frac{3}{10}$ of the large rectangle	✓
A is $\frac{3}{7}$ of the large rectangle	

[2]

(b) The area of Part A is $18k$. = 3□

Write an expression, in terms of k, for the area of Part B.
Give your answer in its simplest form.

6K = 1□ ✓

7□ = 42K ✓

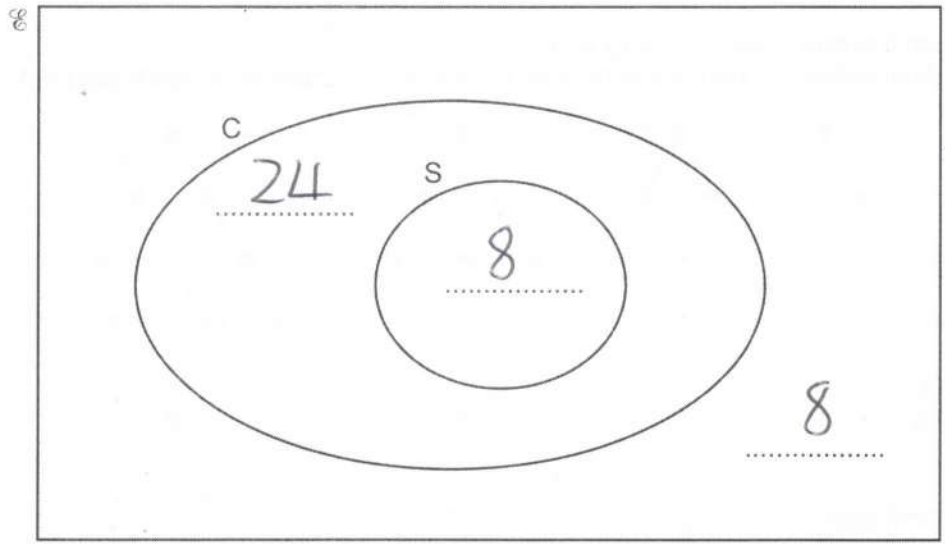
(b) ..... **[2]**

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13 40 people are asked if they like spiders (S) and if they like cats (C).

- 32 people like cats.
- The number of people who like spiders is the same as the number of people who don't like either spiders or cats.

Complete the Venn diagram to show this information.



40-32

[3]

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14 (a) (i) Write down the 4th term of this sequence of numbers.

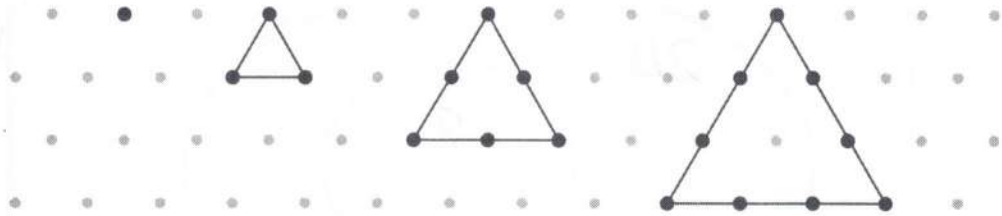
1 4 9 16 25 36 49

[1]

(ii) Write down the name for the sequence of numbers.

(a)(ii) Square (numbers) **[1]**

(b) (i) Amit draws these four diagrams.
Amit writes the number of dots on the perimeter underneath each diagram.



Number of dots on the perimeter	1	3	6	9

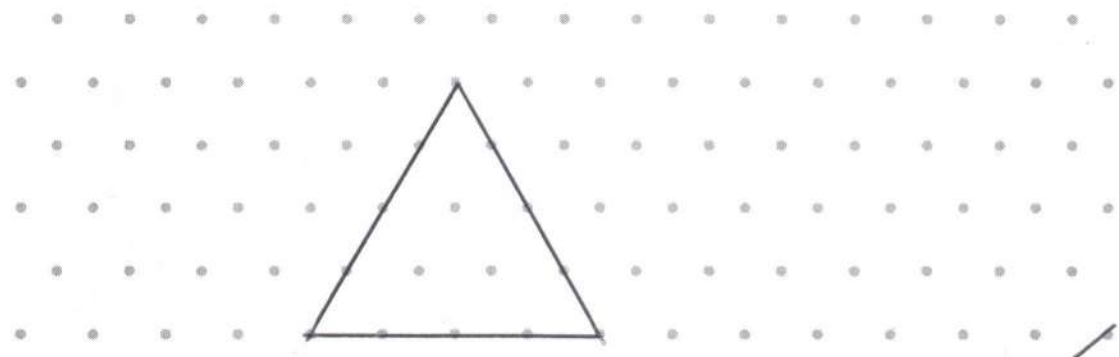
Amit says

My diagrams show the first four triangular numbers.

Complete this statement.

Amit is incorrect because 10 is the 4th triangular number etc **[1]**

(ii) Use the grid below to draw the correct diagram for the 5th triangular number.



[1]

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15 (a) Heidi and Ben both work with the same positive number N.

Heidi works out $\frac{5}{8} \times N$.

Ben works out $0.63 \times N$.

Tick (✓) the correct statement.

Heidi gets a larger answer than Ben	
Heidi gets a smaller answer than Ben	✓
Heidi gets the same answer as Ben	

Give a reason why you ticked the statement. $5/8 = 0.625$ ✓

.....

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

(b) Heidi correctly works out the area of a circle with radius 10 cm.
Heidi uses the formula $A = \pi r^2$.

Heidi's answer is 314.1592654 cm^2.

Ben correctly works out the area of the same circle using the same formula.
Ben's answer is bigger than Heidi's answer.

Show how this can happen. **[2]**

eg

Ben used $\pi = 3.142$ ✓

so $A = 3.142 \times 10^2$

$= 314.2$ ✓

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16 A fair four-sided dice is numbered 3, 4, 5 and 6.
The dice is rolled twice and the two scores are multiplied together.

(a) Complete the table to show all the possible outcomes.

		First roll			
	×	3	4	5	6
Second roll	3	9	12	15	18
	4	12	16	20	24
	5	15	20	25	30
	6	18	24	30	36

✓

[1]

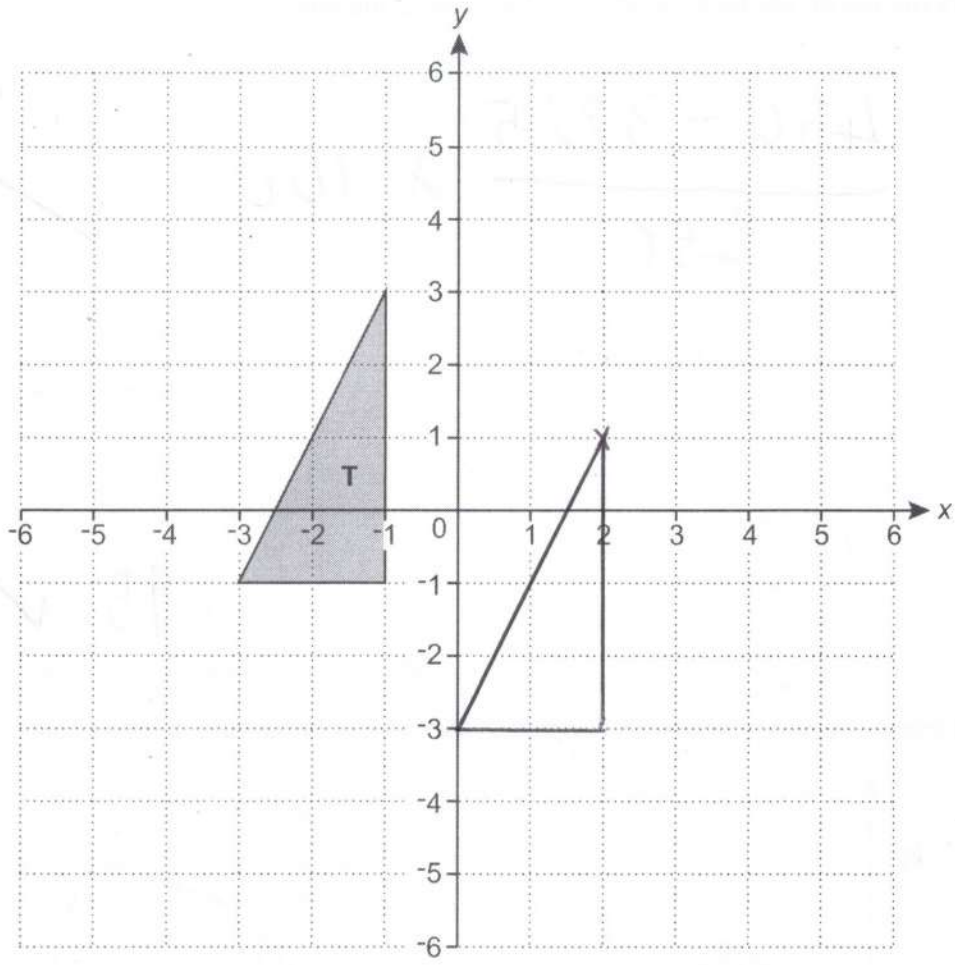
(b) Find the probability that the outcome is a multiple of 8.

$\frac{3}{16}$ ✓ ✓ ft

(b) ..... **[2]**

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17 Triangle **T** is drawn on a coordinate grid.



Translate triangle **T** by vector $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$. **[2]**

→ 3 ✓

↓ 2 ✓

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18 **(a)** The price of a laptop is reduced in a January sale from £450 to £382.50.

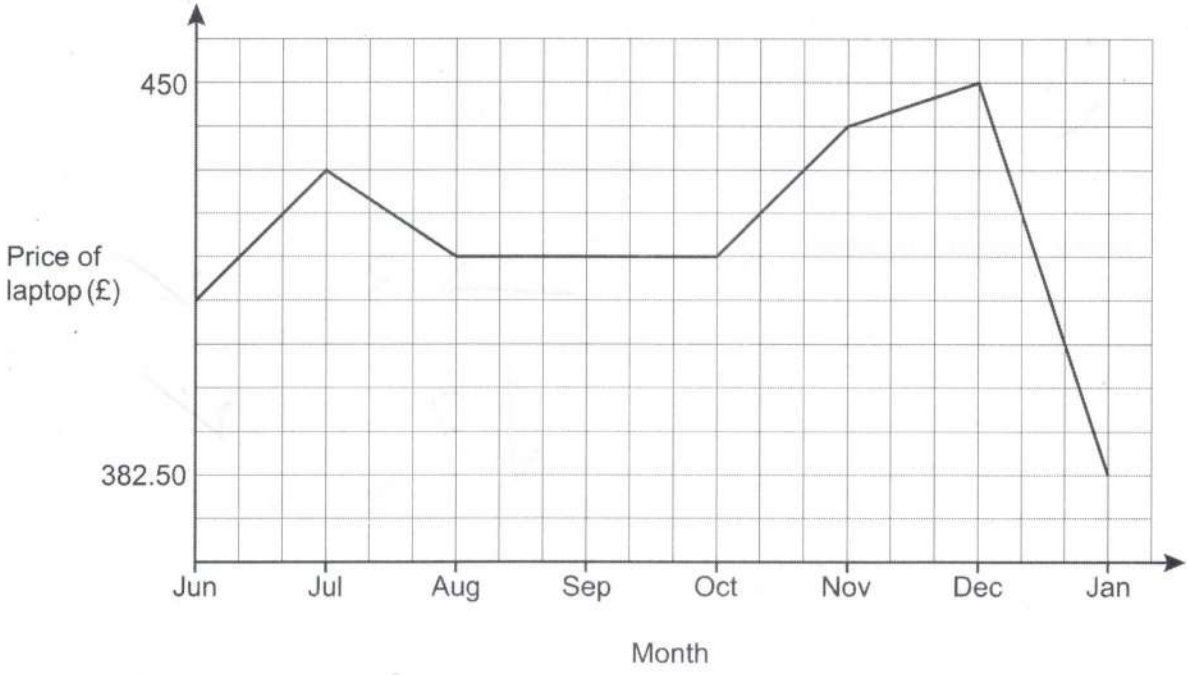
Work out the percentage reduction in the price of the laptop.

$\frac{450 - 382.5}{450} \times 100$ ✓ ✓

15 ✓

(a) ..... % **[3]**

(b) The graph shows the price of the laptop in the months before the January sale.



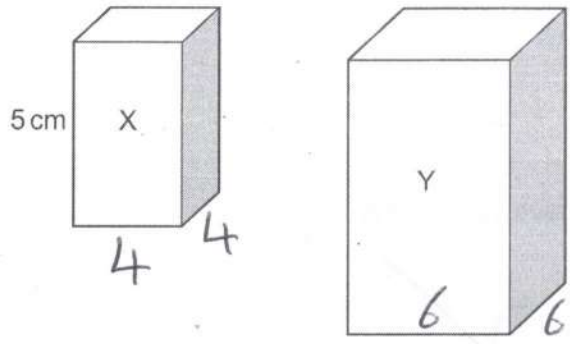
Explain why this graph is misleading.

y-axis doesn't start at 0 ✓ OE

..... **[1]**

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19 The diagram shows two similar cuboids, X and Y.



Not to scale

Cuboid X has a square base with area 16 cm^2 and height 5 cm.
Cuboid Y has a square base with area 36 cm^2.

Work out the height of cuboid Y.
You must show your working.

$5 \times \frac{6}{4}$

7.5

..... cm **[4]**

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20 Sasha makes some cupcakes.
Each cupcake is topped with red or white or yellow icing.

$\frac{1}{3}$ of the cupcakes have red icing.

$\frac{1}{4}$ of the cupcakes have white icing.

(a) Work out the fraction of the cupcakes that have yellow icing.

$1 - \frac{1}{3} - \frac{1}{4}$ ✓

$\frac{5}{12}$ ✓

(a) ..... [2]

(b) Sasha makes all of the icing using butter and sugar in the ratio 1 : 2.
Each cupcake has 60 g of icing.

Sasha uses 0.7 kg of butter to make the yellow icing. = 700g

Find the **total** number of cupcakes Sasha makes.
You must show your working.

B S
1 2

x 700 ✓

700 1400

2100 ÷ 60 = 35 yellow ✓✓

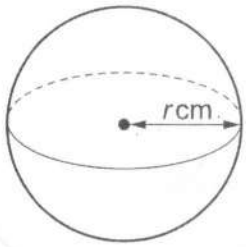
$35 \div \frac{5}{12}$ ✓

84 ✓

(b) ..... [5]

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21 The diagram shows a sphere with radius r cm.



The sphere has a circumference of 50 cm. $= 2\pi r$

Work out the surface area of the sphere.

[The surface area, A, of a sphere with radius r is $A = 4\pi r^2$.]

$r = \frac{50}{2\pi}$ or $\frac{25}{\pi}$ ✓✓

$A = 4 \times \pi \times \left(\frac{25}{\pi}\right)^2$ ✓

$= 795.77\ldots$

796 ✓

..... cm^2 **[4]**

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22 Kai plays an online game.
Kai collects diamonds and rubies.
Each diamond and each ruby is worth a fixed number of points.

In game 1, Kai collects 4 diamonds and 3 rubies and scores 47 points.
In game 2, Kai collects 3 diamonds and 5 rubies and scores 49 points.

Work out the number of points for a diamond and the number of points for a ruby.
You must show your working.

$4d + 3r = 47$ (×3) ✓
$3d + 5r = 49$ (×4) ✓

$12d + 9r = 141$ ✓
$-\ 12d + 20r = 196$
$-11r = -55$
$r = 5$ ✓

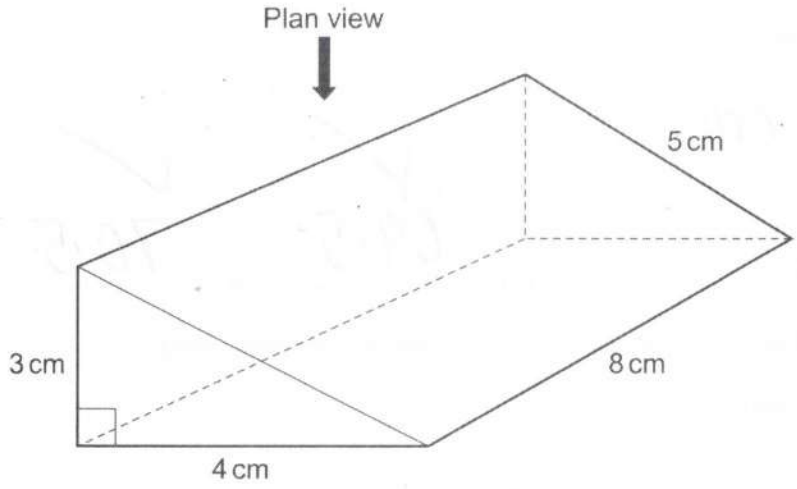
$4d + 15 = 47$
$4d = 32$
$d = 8$ ✓

diamond = 8 points

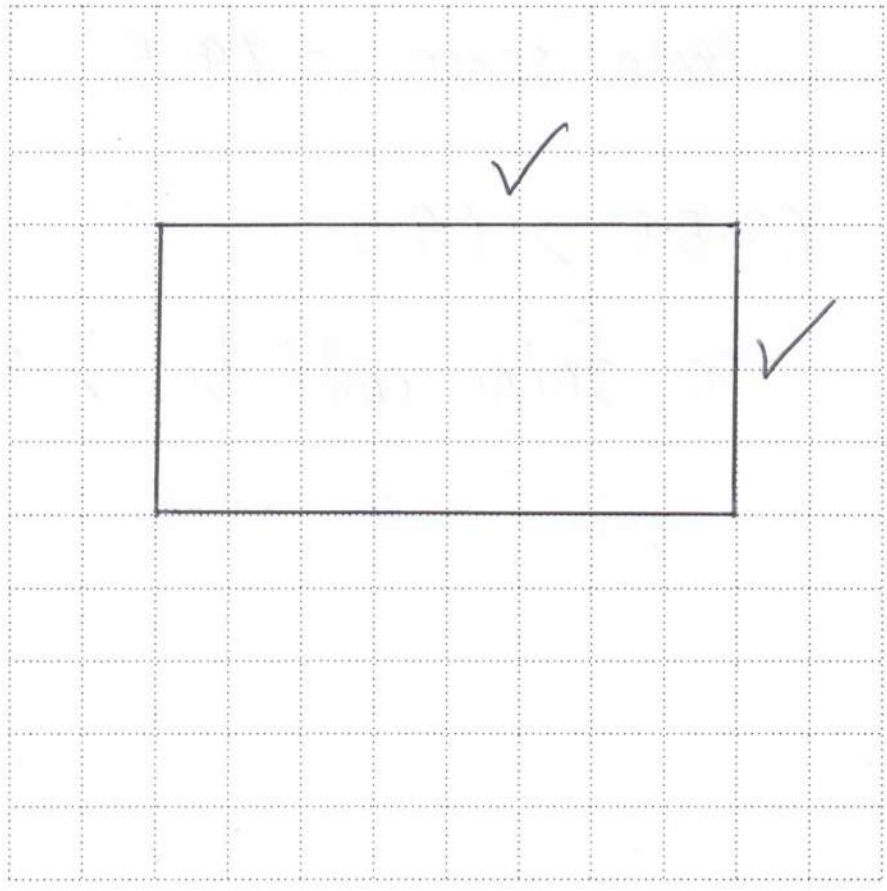
ruby = 5 points **[5]**

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23 The diagram shows a prism of length 8 cm.
The cross-section of the prism is a right-angled triangle.



Draw an accurate plan view of the prism on the one-centimetre grid below.



[2]

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24 A kitchen has space for a fridge.

(a) The width, w, of the space is 70 cm, correct to the nearest centimetre.

Complete the error interval for the width, w.

$\pm \frac{1}{2}$ cm

(a) 69.5 $\leqslant w <$ 70.5 **[2]**

(b) A fridge is advertised as having a width of 69.5 cm, correct to 1 decimal place.

Show that this fridge may **not** fit in the space. **[2]**

Fridge max width = 69.55

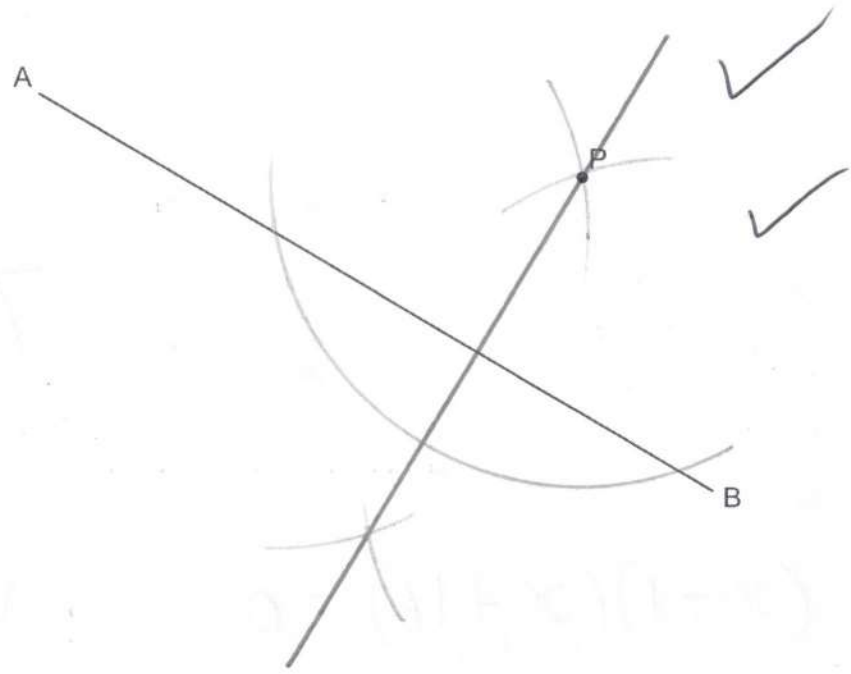
min space = 69.5

69.55 > 69.5

so fridge could be > space

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25 Construct the perpendicular from the point P to the line AB.
Show all of your construction lines.



[2]

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26 **(a)** Solve.

$8x - 11 = 6x + 3$

$2x = 14$ ✓✓

$x = 14 \div 2$

(a) $x =$ 7 ✓ **[3]**

(b) Solve by factorising.

$x^2 + 15x - 16 = 0$

$(x - 1)(x + 16) = 0$ ✓✓

(b) $x =$ 1 or $x =$ -16 ✓ **[3]**

END OF QUESTION PAPER

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