Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Write 23% as a fraction.

$\dfrac{23}{100}$

(Total for Question 1 is 1 mark)

2 Change 800 centimetres to metres.

$\div 100$

8 .... metres

(Total for Question 2 is 1 mark)

3 Write down the value of the 3 in the number 62 837

30/Thirty / 3 tens

(Total for Question 3 is 1 mark)

4 Simplify $7a + a - 5a$

$3a$

(Total for Question 4 is 1 mark)

5 Write the following fractions in order of size.
Start with the smallest fraction.

$0.5 \leftarrow \dfrac{1}{2}$ $\dfrac{2}{3}$ $\dfrac{1}{4} \rightarrow 0.25$

$0.\dot{6}$

$\dfrac{1}{4} , \dfrac{1}{2} , \dfrac{2}{3}$

(Total for Question 5 is 1 mark)

6 A map has a scale of 1 cm represents 4 km.

On the map, the distance from town A to town B is 8 cm.

(a) Work out the real distance, in km, from town A to town B.

$$8 \times 4 \qquad = 32$$

.... km

(2)

The real length of a road is 10 km.

(b) Work out the length of the road on the map.
Give the units of your answer.

$$10 \div 4$$

2·5 cm

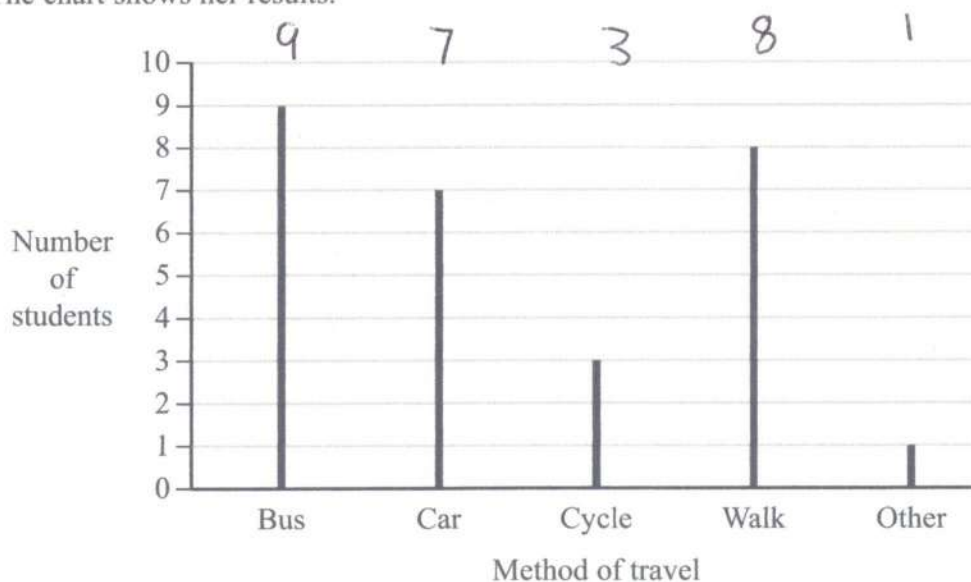...

(2)

(Total for Question 6 is 4 marks)

7 Julie asks some students how they travel to school.
The chart shows her results.

9   7   3   8   1

(a) Write down which method of travel is the mode.

Bus

(1)

More students walk to school than cycle to school.

(b) How many more?

8 - 3 =

5

(1)

(Total for Question 7 is 2 marks)

8 Aisha was born in 1993

There was an election in the year of Aisha's 18th birthday.

There is an election every 5 years.

Will there be an election in 2030?
You must show how you get your answer.

$$1993$$
$$+ \quad 18$$
$$2011$$

2011, 2016, 2021, 2026, 2031

No

(Total for Question 8 is 3 marks)

9 Lucia is going on a skiing holiday.

The cost of ski hire is £26 per day.
The cost of a lift pass is £45 per day.
The cost of ski lessons is £23.50 per hour.

Lucia will pay for
       ski hire for 5 days
       a lift pass for 4 days
       ski lessons for 8 hours.

Lucia has £500

Show that Lucia has enough money to pay for the total cost of ski hire, the lift pass and the ski lessons.
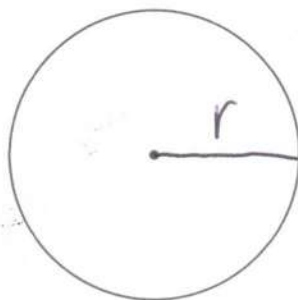
$$26 \times 5 = 130$$
$$45 \times 4 = 180$$
$$23.50 \times 8 = 188$$
$$\overline{498}$$

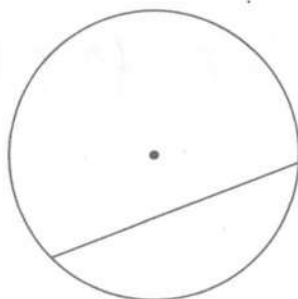with £2 spare

(Total for Question 9 is 3 marks)

10 Here is a circle.

(a) On the diagram above, draw a radius of the circle.

(1)

Here is another circle.

(b) Write down the mathematical name for the straight line inside this circle.

chord

(1)

(Total for Question 10 is 2 marks)

11 There are 8 episodes in a TV series.
    Each episode lasts 45 minutes.

    Work out the total time that the 8 episodes last.
    Give your answer in hours.

$$45 \times 8 = 360m$$

$$360 \div 6 = 6$$

.... 6 .... hours

(Total for Question 11 is 2 marks)

12 Write down three prime numbers that are between 20 and 40

any 3 of 23, 29, 31, 37

.... , ... , ...

(Total for Question 12 is 2 marks)

13 James asks students in Year 10 and Year 11 to name their favourite language from French or German or Spanish.

The two-way table shows information about his results.

	French	German	Spanish	Total
Year 10	33	27	34	94
Year 11	35	45	33	113
Total	68	72	67	207

Complete the two-way table.

(Total for Question 13 is 3 marks)

14 The table gives information about the drinks people ordered in a cafe.

Drink	Number of people
Coffee	30
Hot chocolate	10
Tea	50

Angle
120
40
200

90 → 360
×4

Draw an accurate pie chart for this information.
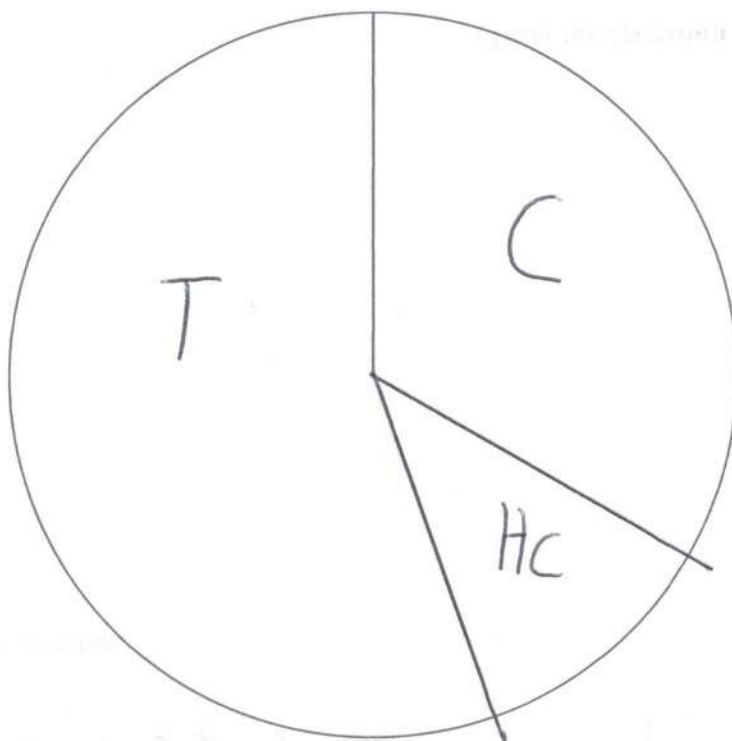
(Total for Question 14 is 3 marks)

15 Which is greater

$$15\% \text{ of } 88 \quad \textbf{or} \quad 20\% \text{ of } 62?$$

You must show all your working.

$$\frac{15}{100} \times 88 = 13 \cdot 2$$

$$\frac{20}{100} \times 62 = 12 \cdot 4$$

15% of 88
is greater

(Total for Question 15 is 3 marks)

16 (a) Simplify $m \times m \times m \times m$

$$m^4$$

(1)

In a competition, a player gets

5 points for each game they win
2 points for each game they draw
0 points for each game they lose.

Amy wins x games and draws y games.

(b) Write down an expression, in terms of x and y, for the total number of points Amy gets.

$$5x + 2y$$

(2)

(Total for Question 16 is 3 marks)

17 Here are the ingredients needed to make 20 shortbread biscuits.

$20 \rightarrow 30$

$\times 1.5$

Ingredients for 20 shortbread biscuits	
120 g	of butter
200 g	of flour
50 g	of sugar

Heidi wants to make 30 shortbread biscuits.

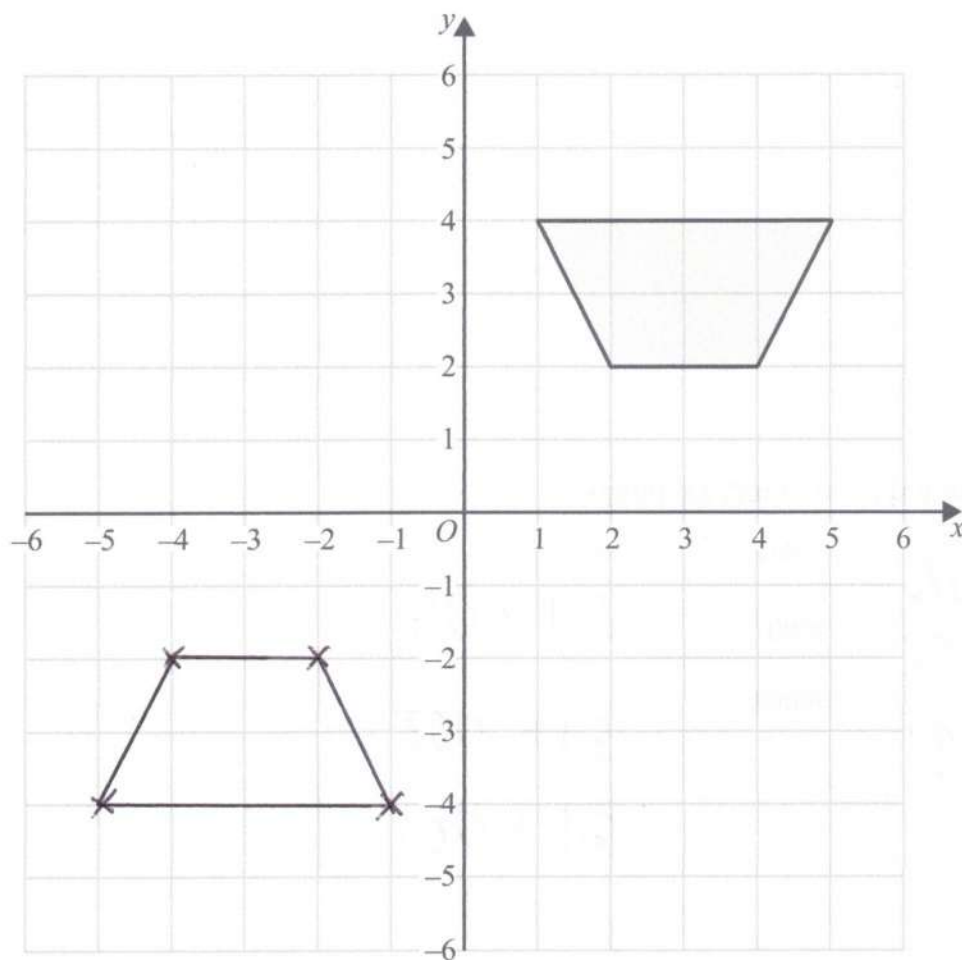How much of each ingredient will Heidi need?

120×1.5

200×1.5

50×1.5

butter .... 180 .... g

flour .... 300 .... g

sugar .... 75 .... g

(Total for Question 17 is 3 marks)

18

(a) On the grid above, rotate the shaded shape 180° about (0, 0)

(2)
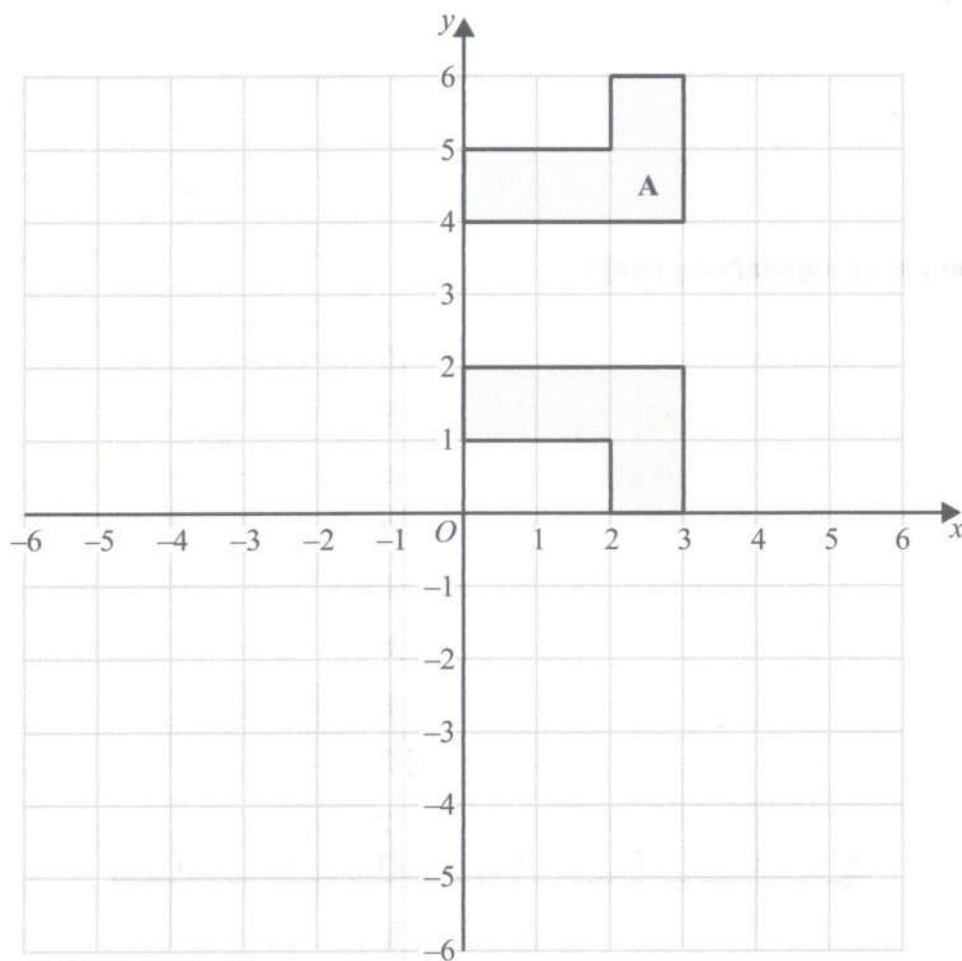
Mike was asked to

'Reflect shape **A** in the line with equation $x = 3$'

Mike's answer is shown on the grid.
His answer is wrong.

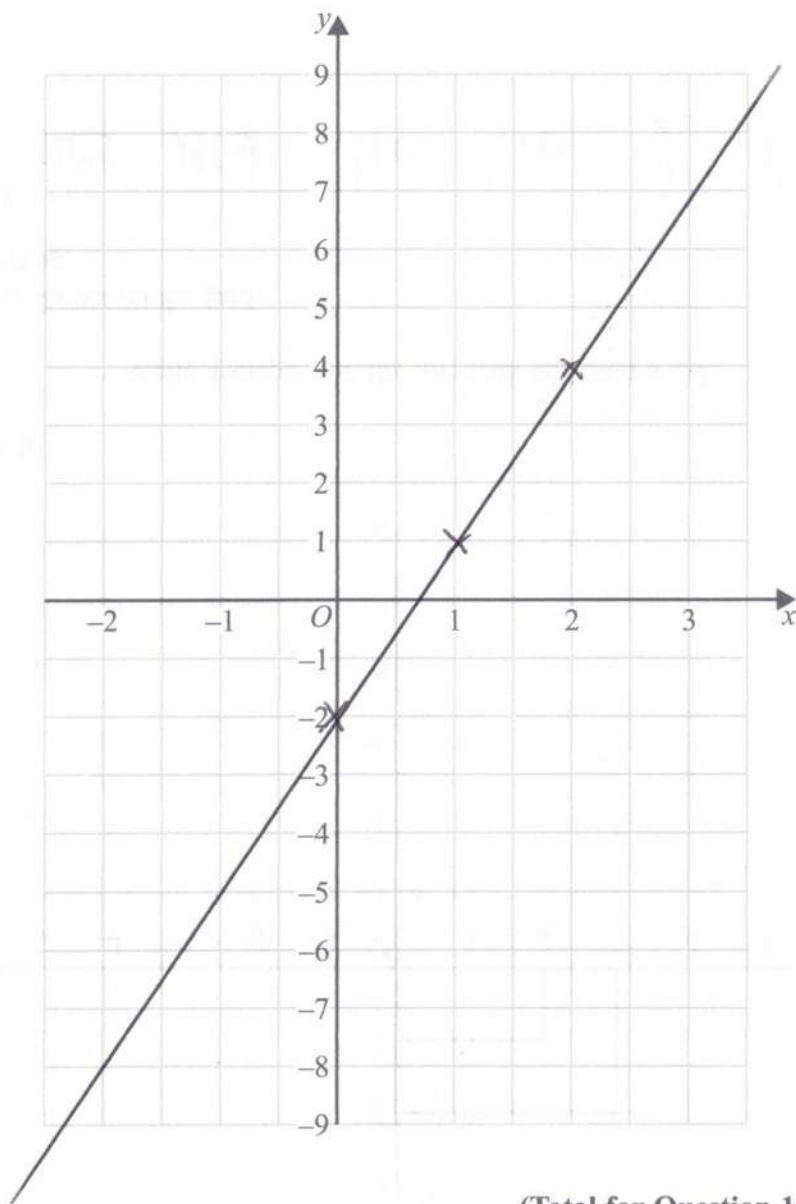(b) Explain why.

He's used the line $y = 3$

(1)

(Total for Question 18 is 3 marks)

P 7 6 9 2 6 A 0 1 5 2 8

19 On the grid below, draw the graph of $y = 3x - 2$ for values of x from -2 to 3

x	0	1	2
y	-2	1	4

(Total for Question 19 is 3 marks)

20 *ABC* and *BCD* are isosceles triangles.
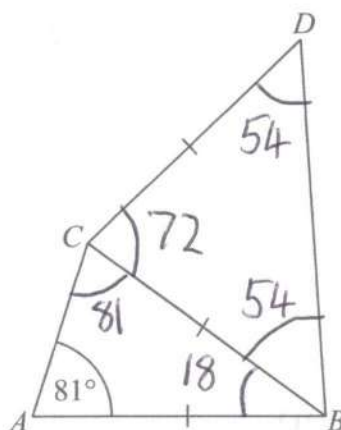
$\dfrac{180-72}{2} = 54$

$AB = BC = CD$

Angle $CAB = 81°$

Angle $BCD = 4 \times$ angle ABC

$18 \times 4 = 72$

Find

the size of angle ABC : the size of angle CBD

Give your answer in the form $1 : n$

You must show all your working.

$18 : 54$

$1 : 3$

....

(Total for Question 20 is 5 marks)
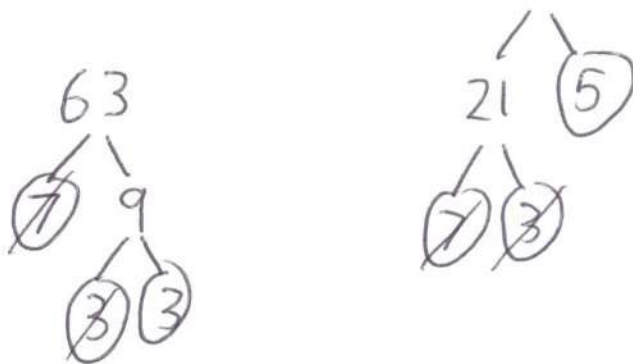
21 (a) Factorise $6x - 15$

$$3(2x - 5)$$

(b) Factorise $m^2 + 5m$

$$m(m + 5)$$

(Total for Question 21 is 2 marks)

22 Find the highest common factor (HCF) of 63 and 105

$$HCF = 3 \times 7 \qquad = 21$$

(Total for Question 22 is 2 marks)

23 (a) (i) Write 5.3×10^4 as an ordinary number.

53 000

 ....

(1)

(ii) Write 7.4×10^{-5} as an ordinary number.

0.000074

 ....

(1)

(b) Calculate the value of $9.7 \times 10^6 + 2.45 \times 10^7$
Give your answer in standard form.

$= 34\,200\,000$

3.42×10^7

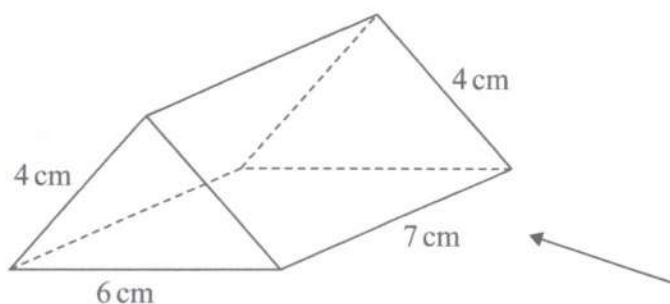 ....
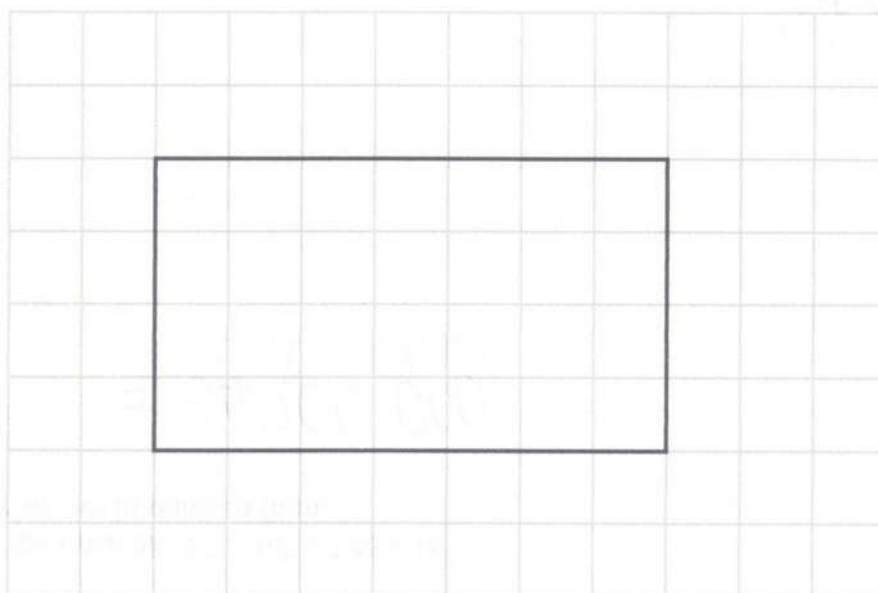
(2)

(Total for Question 23 is 4 marks)

24 The diagram shows a solid triangular prism.

Rana is trying to draw the side elevation of the solid prism from the direction of the arrow.

Here is her answer on a centimetre grid.

(a) Explain why Rana's side elevation is not correct.
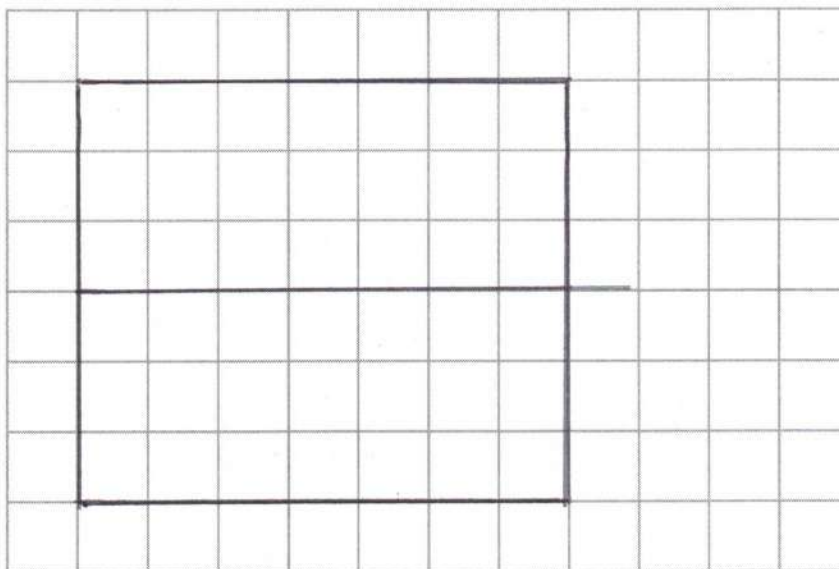
Should be less than 4cm high

(1)

(b) On the centimetre grid below, draw a plan of the solid prism.

(2)

(Total for Question 24 is 3 marks)

25 A company has 25 000 workers.
The number of workers increases at a rate of 6% per year for 3 years.

Calculate the total number of workers at the end of the 3 years.

$$25000 \times 1.06^3$$
$$= 29775.4$$

29775

(Total for Question 25 is 4 marks)

26 Habib has two identical tins.

He puts 600 grams of flour into one of the tins.
The flour fills the tin completely.
The density of the flour is $0.6\,\text{g/cm}^3$

$$V = \frac{M}{D} = \frac{600}{0.6} = 1000\,\text{cm}^3$$

Habib puts 600 grams of salt into the other tin.
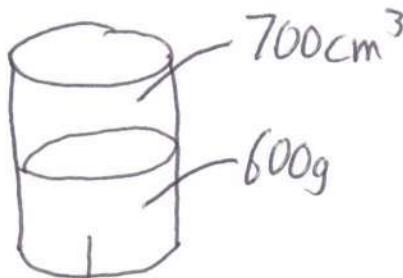The salt does **not** fill the tin completely.
The volume of the space in the tin that is **not** filled with salt is $700\,\text{cm}^3$

Work out the density of the salt.
You must show all your working.

New tin

— 700 cm³

— 600g

$1000 - 700 = 300\,\text{cm}^3$

$$D = \frac{M}{V} = \frac{600}{300} = \underline{\quad 2 \quad}\ \text{g/cm}^3$$
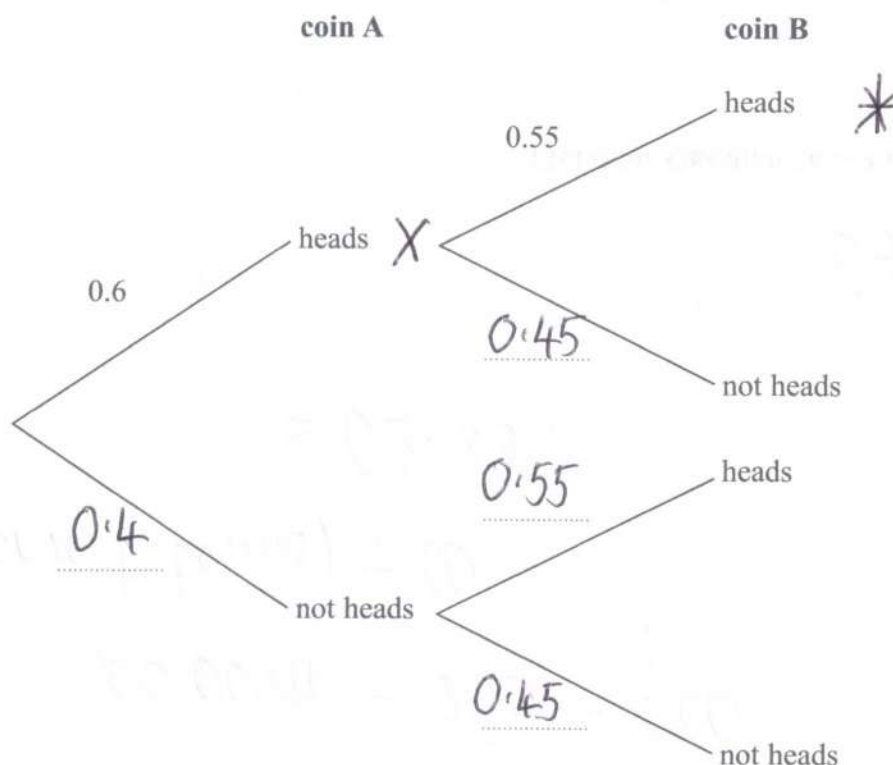
(Total for Question 26 is 4 marks)

27 Tim has two biased coins, coin **A** and coin **B**.
He is going to throw both coins.

The probability that coin **A** will land on heads is 0.6
The probability that coin **B** will land on heads is 0.55

(a) Complete the probability tree diagram.

coin A   coin B

                                    heads ✳
                          0.55
            heads X
    0.6   0.45
                                    not heads

                          0.55   heads
    0.4
            not heads
                          0.45
                                    not heads

(2)

Tim throws coin **A** once and he throws coin **B** once.

(b) Work out the probability that both coins land on heads.
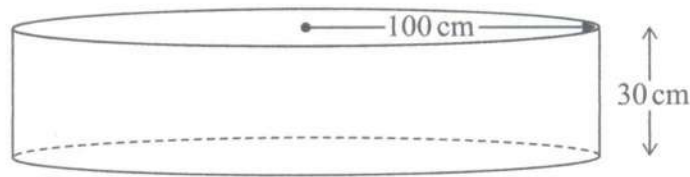
✳ 0.6 × 0.55

= 0.33

(2)

(Total for Question 27 is 4 marks)

28 A paddling pool is in the shape of a cylinder.

The pool has radius 100 cm.
The pool has depth 30 cm.

The pool is empty.
It is then filled with water at a rate of 250 cm³ per second.

Work out the number of minutes it takes to fill the pool completely.
Give your answer correct to the nearest minute.
You must show all your working.

$$V = \pi \times r^2 \times h = \pi \times 100^2 \times 30$$

$$= 300\,000\,\pi \text{ cm}^3$$

$$300\,000\,\pi \div 250$$

$$(\text{convert to mins}) \div 60$$

$$\simeq 62.83\ldots$$

.....................**63**..................... minutes

(Total for Question 28 is 4 marks)

29 $w = 40 - t^2$

(a) Calculate the value of w when $t = -5$

$$= 40 - (-5)^2$$

$$= 40 - 25$$

$w =$ __15__

(2)

$p = \dfrac{h-5}{3}$

(b) Make h the subject of the formula.

⊗3   ⊗3

$3p$ $=$ $h - 5$

⊕5   ⊕5

$h = 3p + 5$

(2)

(Total for Question 29 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS