Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1. Write 0.013 as a fraction.

$\frac{13}{1000}$

.....

(Total 1 mark)

---

2. Change 6.4 centimetres into millimetres

6.4×10

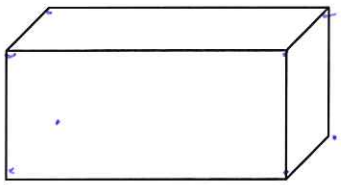
64 mm

.....

(Total 1 mark)

---

3. Here is a cuboid.



How many vertices does the cuboid have?

vertices - points/corners

8

.....

(Total 1 mark)

---

4. Find the value of 7^4

$7 \times 7 \times 7 \times 7$

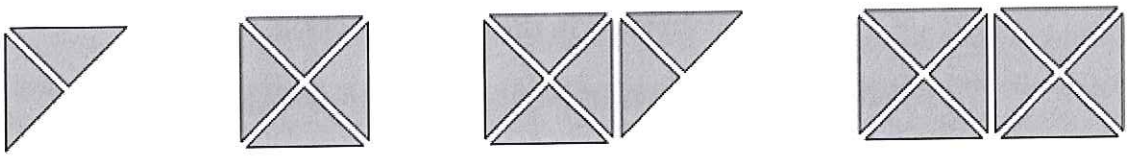
2401

.....

(Total 1 mark)

---

5. Here are some patterns made from triangles.



Pattern number 1 | Pattern number 2 | Pattern number 3 | Pattern number 4

(a) Complete the table.

Pattern number x	1	2	3	4	5
Number of triangles n	2	4	6	8	10

$n = 2x$

(1)

(b) How many triangles are needed for Pattern number 12?

number of triangles $(n) = 2x$

$n = 2(12)$

$= 24$

24

(1)

Luke says that Pattern number 40 has 82 triangles.

(c) Luke is wrong.
Explain why.

Pattern Number $(x) = 40$ $\therefore 2 \times 40 = 80$.

when pattern number is 40, the number of triangles will be 80, not 82.

(1)

(Total 3 marks)

6. Janet sends parcels by Parcel Express.
The table shows information about the cost of sending a parcel by Parcel Express.

Parcel Express	
Weight range	**Cost**
Less than 2 kg	£3.80
2 kg to less than 5 kg	£5.99
5 kg to 10 kg	£71.4 ← meant to be £7.14

The table below gives information about the numbers and weights of the parcels Janet sent in April and in May.

Number of parcels		
Weight range	**April**	**May**
Less than 2 kg	23	21
2 kg to less than 5 kg	28	27
5 kg to 10 kg	19	32

$3.80 \times (23+21) = 167.20$
$5.99 \times (28+27) = 329.45$
$7.14 \times (19+32) = 364.14$

Janet could have sent her parcels by Parcels R Go.
The table below shows information about the cost of sending a parcel by Parcels R Go.

Parcels R Go	
Weight range	**Cost**
0–15 kg	£5.99

$5.99 \times (23+21+28+27+19+32)$
$= £898.50$

Janet thinks that it would have been cheaper to send all her parcels by Parcels R Go.

Is Janet right?
You must show your working.

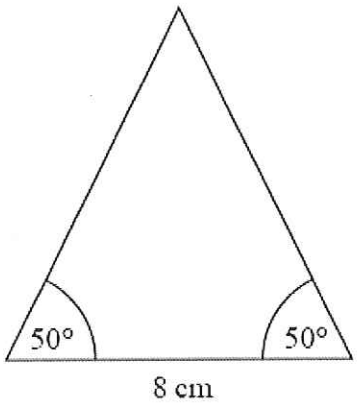
Parcel Express
167.20
329.45
+364.14
£860.79

Parcels R Go
£898.50 ← more expensive

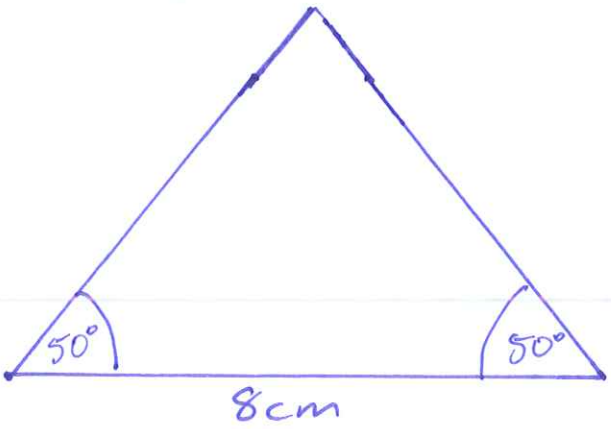
Janet is wrong, Parcel Express is cheaper.

(Total 5 marks)

7. Here is a sketch of the end of a roof of a toy house.



Draw an accurate diagram of the end of the roof.



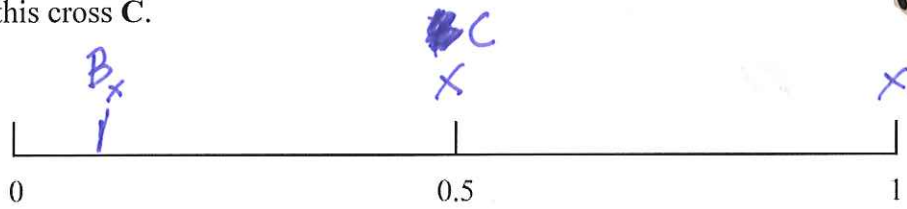
(Total 2 marks)

8. On the probability scale, mark with a cross (×), the probability that

(i) you will have something to drink tomorrow. 100% - 1/1
Label this cross **A**.

(ii) a teacher chosen at random was born on a Monday. 1/7 - 0.14
Label this cross **B**.

(iii) a fair 6-sided dice will show an even number when thrown. 3/6 - 1/2 - 0.5
Label this cross **C**.



(Total 3 marks)

---

9. Jason collected some information about the heights of 19 plants.
This information is shown in the stem and leaf diagram.

1	1	2	3	3		
2	3	3	5	9	9	
3	0	2	2	6	6	7
4	1	1	4	8		

Key: 4|8 means 48mm

Find the median.

Median = middle value.
19 values in total
∴ 10th value is median.

10th = 30mm

30 ..... mm

(Total 2 marks)

---

10. Some of the land in the Netherlands is used to grow bulbs.
The table shows the percentages of this land used to grow the different types of bulbs.

Type of bulb	Hyacinth	Tulip	Daffodil	Lily	Other
Percentage	8%	50%	12%	x%	7%

(a) Work out the value of x.

$x = 100 - (8 + 50 + 12 + 7)$

$= 100 - 77$

$x = 23$

$x =$ 23% **(1)**

The area of land used to grow bulbs for hyacinths is 1200 hectares.

(b) Work out the area of land used to grow bulbs for daffodils.

Hyacinth = 1200ha = 8%.

$\therefore \frac{1200}{8} = 1\%$.

1% = 150ha

Daffodils - 12%.

$= 150 \times 12 = 1800$

1800 hectares **(2)**

(Total 3 marks)

11. Barbara has a tube of sweets.

There are 5 sweets in the tube.

There is one sweet of each of these colours in the tube.

red blue green yellow pink

Barbara takes two sweets at random from the tube.

(a) Write down all the possible combinations of colours she can take.

RB, RG, RY, RP, BG, BY, BP, GY, GP, YP

.....

.....

(2)

(b) What is the probability that Barbara takes a red sweet and a yellow sweet from the tube?

1/10

.....

(1)

(Total 3 marks)

12. Ali takes his car to a garage.
The car has a 5000 mile service.
It also has an MOT test.

Costs	
5000 mile service	£79 plus VAT at 20%
10 000 mile service	£99 plus VAT at 20%
MOT test	£39 plus VAT at 20%

(a) Work out Ali's total bill.

5000 mile service = $79 \times 1.2 = £94.80$
MOT Test = $39 \times 1.2 = £46.80$ +
$£141.60$

£ 141.60
(3)

Ali bought his car for £20 000

The car depreciated by 20% the first year.
The car depreciated by 10% the second year.

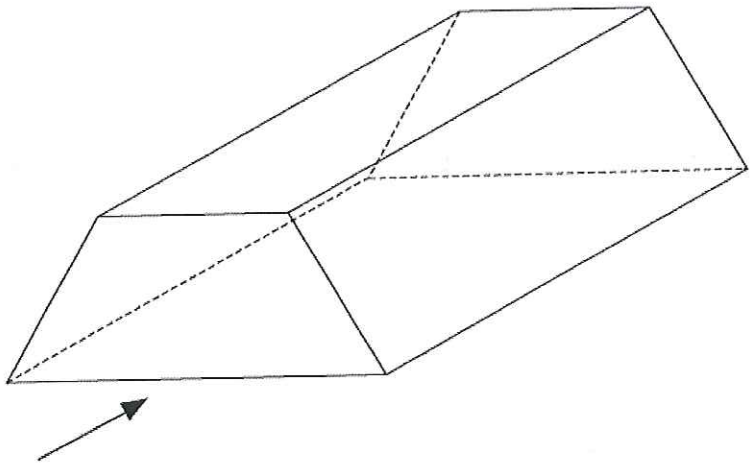
(b) Work out the value of the car at the end of the second year.

$20,000 \times 0.8 = 16,000$
$16,000 \times 0.9 = 14,400$

£ 14,400
(3)

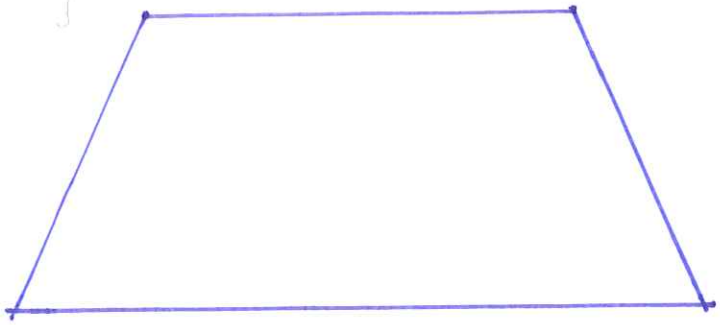
(Total 6 marks)

13.



The diagram shows a prism.

In the space below, sketch the front elevation from the direction marked with an arrow.



(Total 2 marks)

14. Becky says,

"When you square a prime number you always get an odd number."

(a) Write down an example to show that Becky is wrong.

$2 \times 2 = 4$. $2^2 =$ an even number.

(1)

James says,

"When you cube any negative number you always get a negative number."

(b) James is right.
Explain why.

A negative x negative = a positive, then times a negative = a negative.

i.e. $-2^3 = -2 \times -2 = 4 \times -2 = -8$

(2)

(Total 3 marks)

---

15. There are some blue counters, red counters and green counters in a bag.

6x 3x x

There are twice as many blue counters in the bag as red counters in the bag.
There are 3 times as many red counters in the bag as green counters in the bag.

For the counters in the bag, write down the ratio of

the number of blue counters to the numbers of red counters to the number of green counters.

6 : 3 : 1

(Total 2 marks)

---

16. Lev writes down the following

$$\frac{2}{3}+\frac{5}{8}=\frac{7}{11}$$

Without doing the exact calculation, explain why Lev's answer cannot be correct.

Both fractions are greater than half, so the sum should at least be greater than 1.

(Total 1 mark)

17.

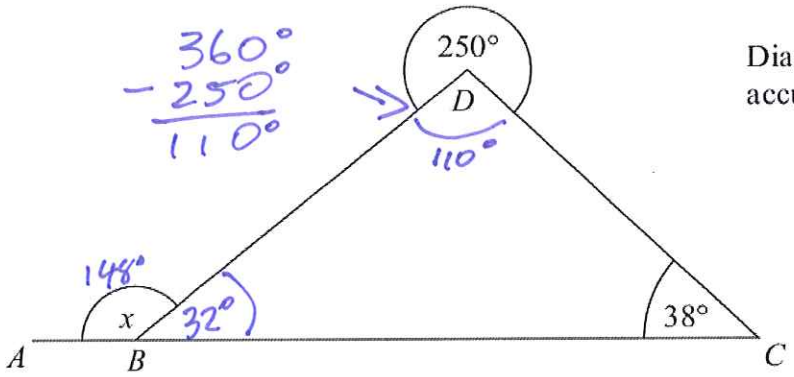


Diagram **NOT** accurately drawn

ABC is a straight line.
Angle *BCD* = 38°
The reflex angle *BCD* = 250°

Work out the size of the angle marked *x*.
Give reasons for your answer.

– Angles at a point add up to 360°

Angle BDC = 360° − 250 = 110°

Angles in a triangle add up to 180°

∴ Angle CBD = 180 − (110 + 38)
= 180 − 148
= 32°

Angles on a straight line = 180°

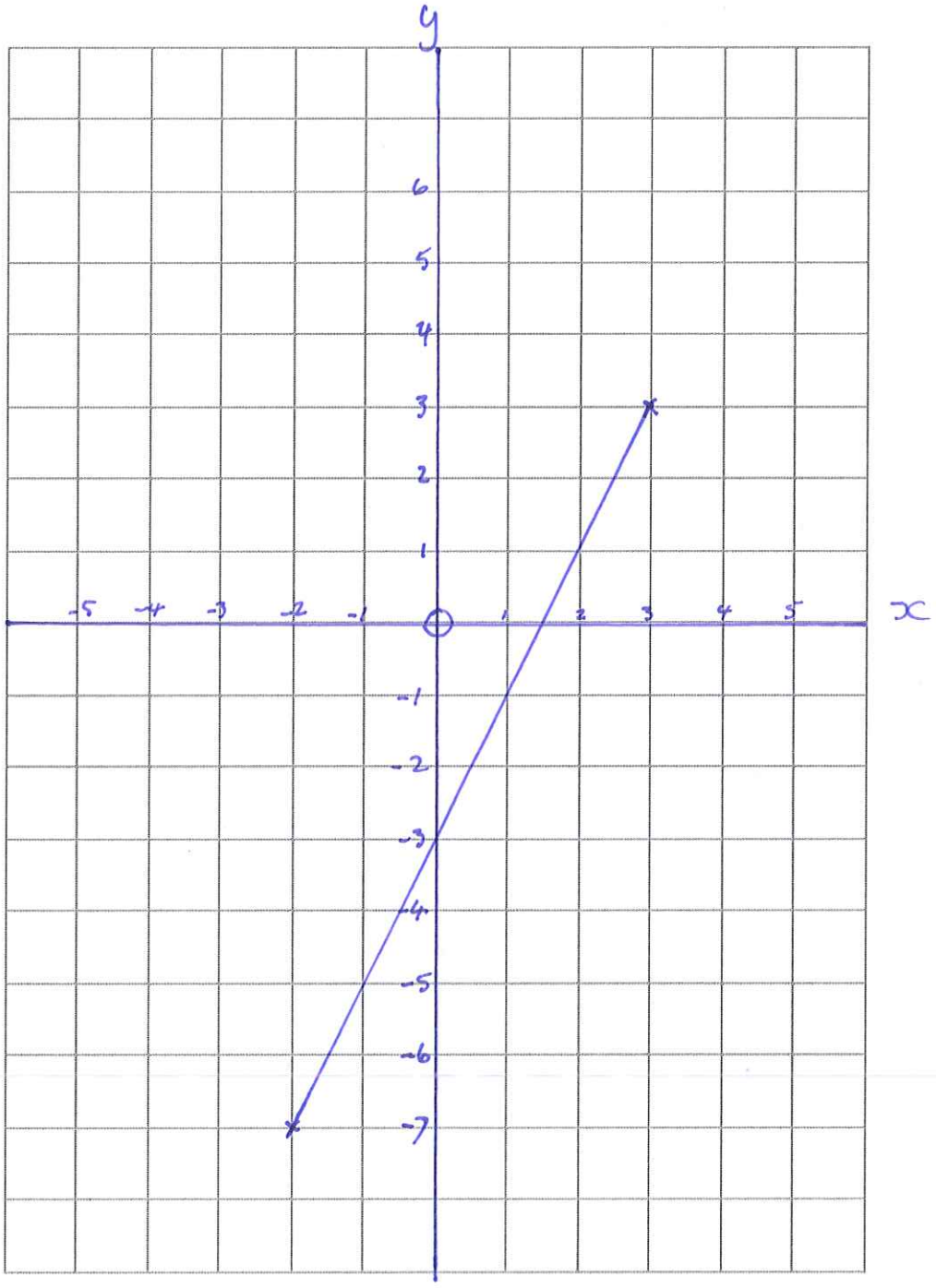
∴ x = 180 − 32
x = 148°

(Total 4 marks)

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

x	-2	-1	0	1	2	3
y	-7	-5	-3	-1	1	3

$y = 2(-2) - 3$
$= -7$
$y = 2(-1) - 3$
$= -5$
$y = 2(0) - 3$
$= -3$
...
Pattern - increasing by +2.

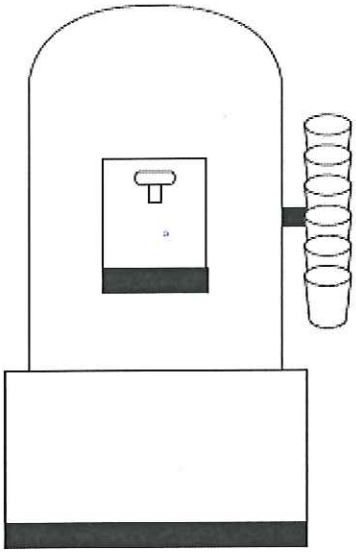


(Total 4 marks)

19.

1L = 1000 mL

∴ 19.5L = 19500ml



A water container has 19.5 litres of water in it.
A cup holds 210 ml of water.

At most 92 cups can be filled completely from the water container.

Explain why.
You must show all your working.

19,500ml ÷ 210
= 92.8....
Only 92 cups can be completely filled.

OR 210 x 92 = 19320ml = 19.32L ← OK
210 x 93 cups = 19530 ml = 19.53L ← Not OK

(Total 3 marks)

20. The total cost of 3 apples and 4 pears is £1.84 = 184p

The total cost of 5 apples and 2 pears is £1.76 = 176p

Work out the cost of one apple and the cost of one pear.

Let apples = a pears = p.

1. $3a + 4p = 184p$
2. $5a + 2p = 176p$ ← ×2 to make $2p = 4p$.

Must use process of elimination.

$\therefore 10a + 4p = 352p$.) subtract to get rid of 4p.

$- \quad 3a + 4p = 184p$

$\therefore \quad 7a = 352 - 184p = 168p$.

$a = \frac{168}{7} = 24p$

Now use $a = 24$ to find p.

$5 \times 24 + 2p = 176$

$120 + 2p = 176$

$2p = 176 - 120$

$2p = 56$

$p = 56 \div 2$

$p = 28$

Cost of one apple ..... 24 .....p

Cost of one pear ..... 28 .....p

(Total 4 marks)

21. There are a total of 120 counters in a box.

There are only red counters and blue counters in the box.
There are three times as many red counters as blue counters in the box.

Carl takes $\frac{1}{3}$ of the red counters from the box.

Kerry takes 80% of the blue counters from the box.

Work out the ratio of the number of red counters to the number of blue counters now in the box.

Give your ratio in its simplest form.

Ratio - R : B
3 : 1 ← 4 parts in total

$\frac{120}{4} = 30$

$\therefore x = 30$

Ratio must be Red : Blue.

Box Original Value = 120

Blue : Red
$1x$: $3x$
30 : 90

Red.

$-\frac{1}{3}$ from $3x = 2x = 60$

-80% from $2x = 0.2x = 6$
Blue

OR

$\frac{20}{100} \times 30 = 6$

After Kerry and Carl have taken the counters out of the box there will be 60 Red and 6 Blue counters left.

Ratio - 60 : 6

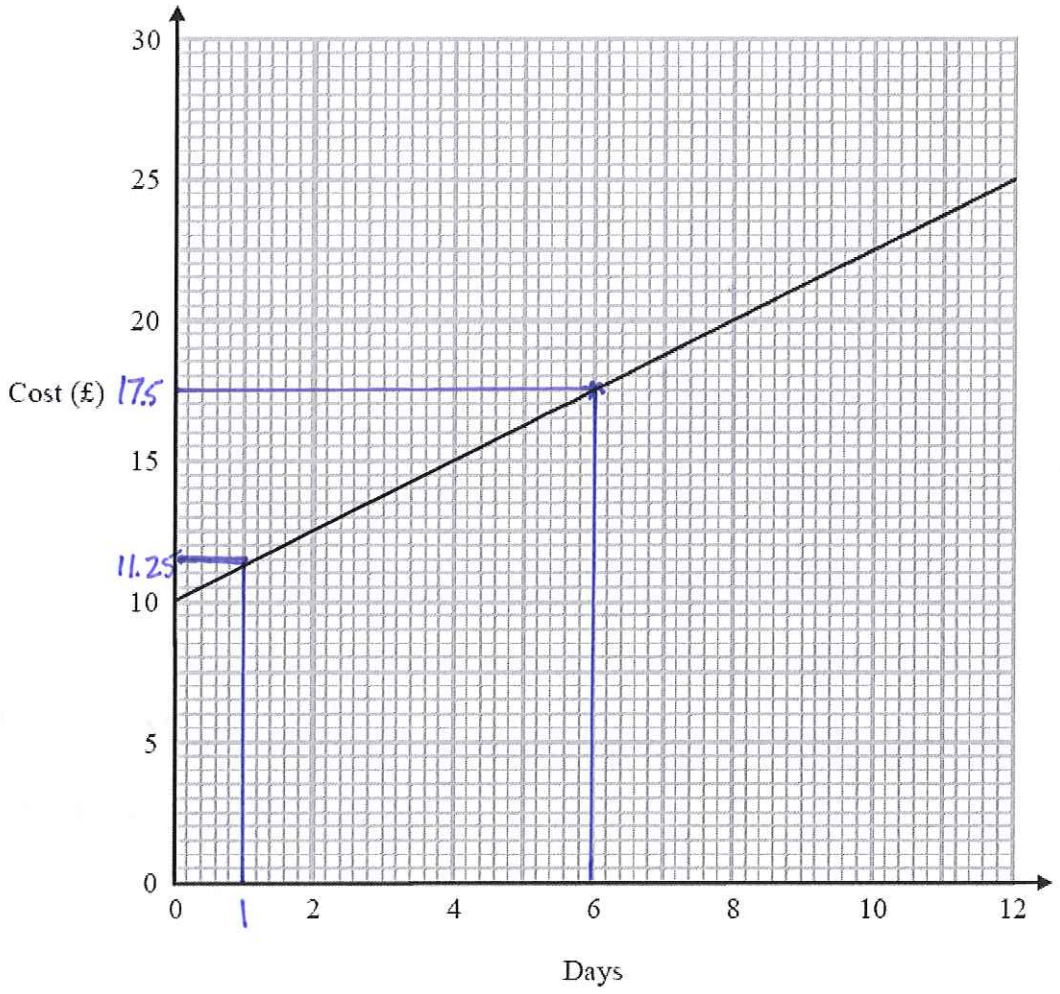
$\div 6 \quad \div 6$

Simplify 10 : 1

10 : 1

(Total 5 marks)

22. Salome hires a chainsaw from the **Saws are Us** company.
This graph shows the cost of hiring a chainsaw from **Saws are Us** for up to 12 days.



(a) Find the cost of hiring the chainsaw for 6 days from **Saws are Us**.

£ 17.50

(1)

The cost of hiring a chainsaw from **Saws are Us** is £10 plus a daily rate.

(b) Work out the daily rate.

£ 1.25

(1)

SAU

Salome wants to compare the cost of hiring a chainsaw from **Saws are Us** and from **Saws to You.**

STY

Saws to You charge £3 for each day of hire.

Salome hires chainsaws for different periods of time.
She wants to use the cheaper company.

(c) Which of these two companies is the cheaper to hire the chainsaw from?
You must show your working and explain your answer.

Days	SAU	STY
3	13.75	9
4	15.00	12
5	16.25	15
6	17.50	18
7	18.75	21

STY cheaper up to 5 days, SAU cheaper for 6 days or more.

(3)

(Total 5 marks)

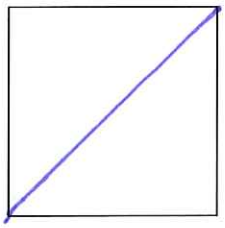
Saws are Us = £10 + £1.25 per day

Day 1 - 11.25, Day 2 - 11.25 + 1.25 = 12.50 etc...

Saws to You has a fixed rate of £3 per day.

We can see that STY is cheaper up to the 5th day of hire, but from 6 days on wards, Saws are Us is cheaper.

23. A square has sides of length 8.4 cm.



8.4 cm

Work out the length of a diagonal of the square.
Give your answer correct to 3 significant figures.

Pythagorus states $a^2 + b^2 = c^2$

Let the sides of the square = a and b

Let the diagonal = c

$\therefore 8.4^2 + 8.4^2 = c^2$

$70.56 + 70.56 = 141.12$

$\therefore c = \sqrt{141.12}$

$= 11.879....$

3 significant figures

$= 11.9$

11.9 ..... cm

(Total 3 marks)

24. The diagram shows a circular pond with a path around it.

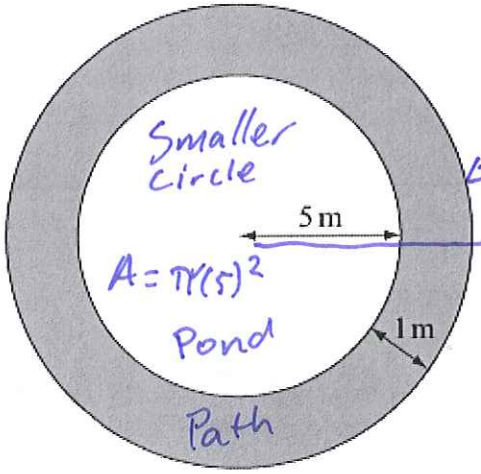


Diagram NOT accurately drawn

Larger circle = π(6)²

← 6m

Area of circles = πr²

The pond has a radius of 5m.
The path has a width of 1m. 5 + 1 = 6

Work out the area of the path.
Give your answer correct to 3 significant figures.

Area of Path = Area of Outer circle − area of pond.

∴ Area of Path = π(6)² − π(5)²

= 113 − 78.5

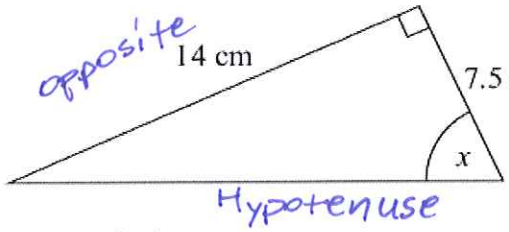
= 34.5

34.5 ..... m^2

(Total 3 marks)

SOH / CAH / TOA

25. Here is a right-angled triangle.



← use tan

Work out the size of the angle marked x.
Give your answer to the nearest degree.

We are given the opposite and adjacent sides.

$\tan x$ = opposite ÷ adjacent

$= 14 \div 7.5$

$\tan x = 1.86$

$\therefore x = \tan^{-1}(1.86)$

$= 61.73...$

Nearest Degree = 62

62 .....°

(Total 3 marks)

1m = 100cm

convert to m^2

26. A box is on a table.

The area of the box in contact with the table is 1500 cm^2.
The pressure on the table is 28 newtons/m^2.

0.15 m^2

Work out the force exerted by the box on the table.
Give your answer correct to the nearest whole number.

$$p = \frac{F}{A}$$
p = pressure
F = force
A = area

Pressure = 28 newtons/m^2

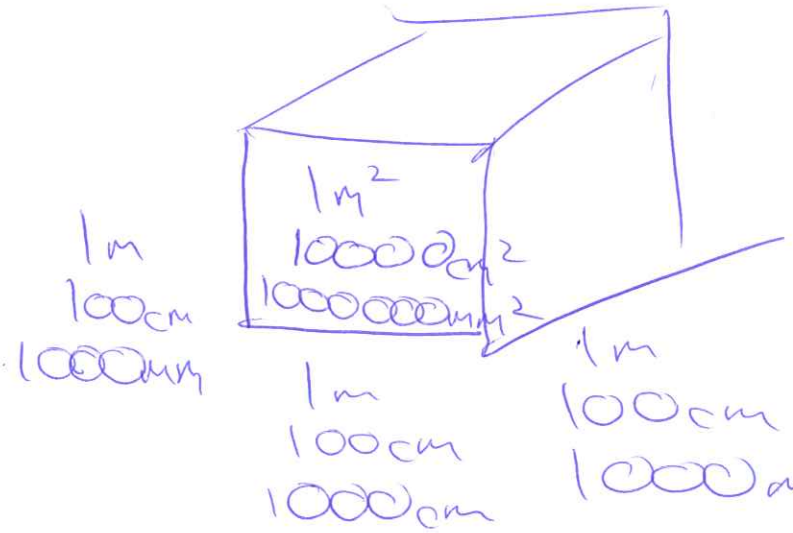
$1m^2 = 100cm \times 100cm$

$1500cm^2 \div (100 \times 100)$

$= 0.15m^2$

187 .....newtons

(Total 3 marks)



$1m^3$
1000000 cm^3
1000000000 mm^3

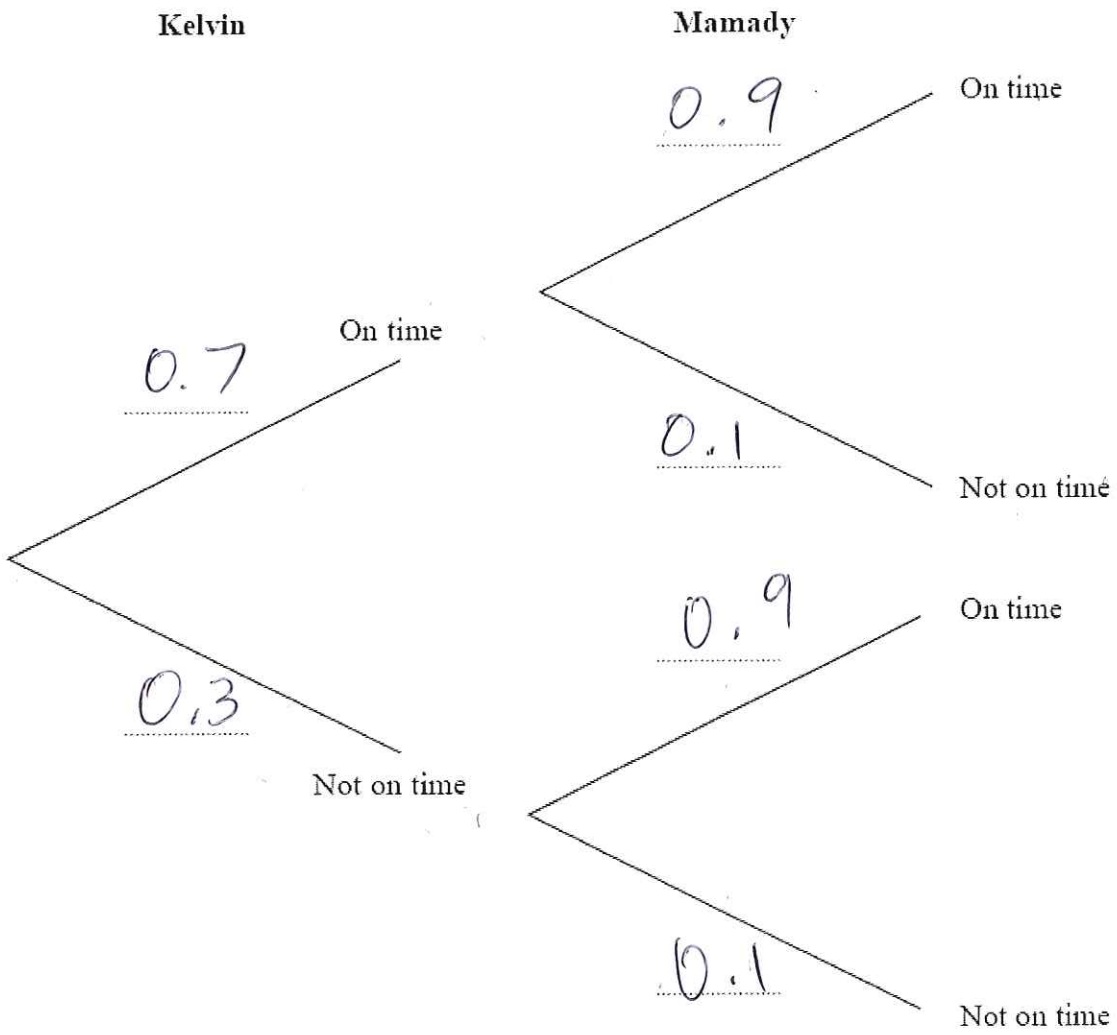
$F = 28 \div 0.15$

$= 187$ newtons

nearest whole number

27. Kelvin and Mamady are in the same class.
The probability that Kelvin arrives on time is 0.7.
The probability that Mamady arrives on time is 0.9.

Complete the probability tree diagram.



(2)

(b) Work out the probability that Kelvin and Mamady both arrive on time.

$0.7 \times 0.9 = 0.63$

0.63

(2)

(Total 4 marks)

TOTAL FOR PAPER IS 80 MARK