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.

0.013 = 13/1000

$\frac{13}{1000}$

(Total for Question 1 is 1 mark)

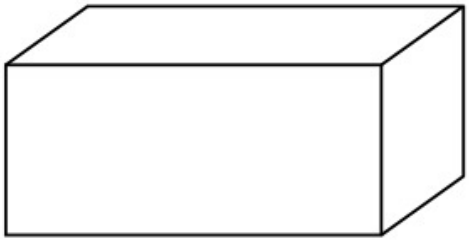
2 Change 6.4 centimetres into millimetres.

6.4 × 10 = 64 mm

64

(Total for Question 2 is 1 mark)

3 Here is a cuboid.



How many vertices does the cuboid have?

A cuboid has 8 corners (vertices).

8

(Total for Question 3 is 1 mark)

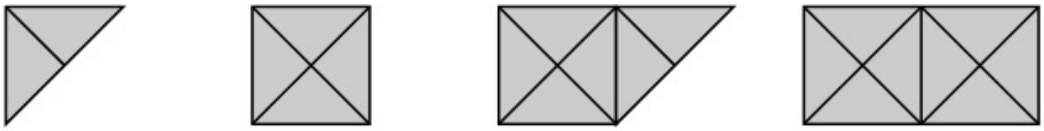
4 Find the value of 7^4

7 × 7 × 7 × 7 = 2401

2401

(Total for Question 4 is 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	1	2	3	4	5
Number of triangles	2	4	6	**8**	**10**

(1)

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

24

(1)

Luke says that Pattern number 40 has 82 triangles.

(c) Luke is wrong.
Explain why.

Pattern 40 has 40 × 2 = 80 triangles, not 82

(1)

(Total for Question 5 is 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

This table gives information about the numbers of parcels Janet sent in April and in May.

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

Parcels R Go	
0 – 15 kg	£5.99

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.

Total parcels = 44 + 55 + 51 = 150

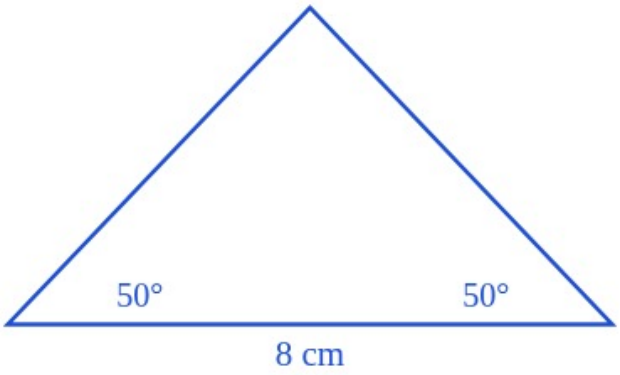
Parcels R Go = 150 × £5.99 = £898.50

Parcel Express = 44 × £3.80 (£167.20) + 55 × £5.99 (£329.45) + 51 × £71.4 (£3641.40)

= £4138.05 (Yes, Janet is right). [Using £7.14 gives £860.79 → No].

(Total for Question 6 is 5 marks)

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

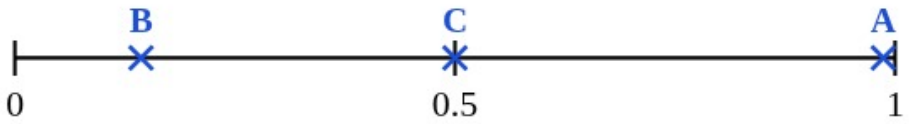


Draw an accurate diagram of the end of the roof.

Draw 8 cm horizontal line, measure 50° at both ends with a protractor.

(Total for Question 7 is 2 marks)

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



(i) you will have something to drink tomorrow.
Label this cross A.
(ii) a teacher chosen at random was born on a Monday.
Label this cross B.
(iii) a fair 6-sided dice will show an even number when thrown.
Label this cross C.

(i) Almost certain (near 1)

(ii) $1/7 \approx 0.14$

(iii) $3/6 = 0.5$

(Total for Question 8 is 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 48 mm

Find the median.

10th value in ordered stem-and-leaf diagram is 30 mm

30 mm

(Total for Question 9 is 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.

100 − (8 + 50 + 12 + 7) = 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.

8% = 1200

⇒ 1% = 150

⇒ 12% = 12 × 150 = 1800 hectares

1800 hectares

(2)

(Total for Question 10 is 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.

(R, B), (R, G), (R, Y), (R, P), (B, G), (B, Y), (B, P), (G, Y), (G, P), (Y, P)

(2)

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

1 out of 10 = 1/10

$\frac{1}{10}$

(1)

(Total for Question 11 is 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.

(79 + 39) × 1.20 = 118 × 1.20 = £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 × 0.80 = 16 000

16 000 × 0.90 = £14 400

£ **14 400**

(3)

(Total for Question 12 is 6 marks)

13

The diagram shows a prism.
In the space below, sketch the front elevation from the direction marked with an arrow.

Front view of the prism is a trapezium.

(Total for Question 13 is 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 is prime and $2^2 = 4$, which is even

(1)

James says,
"When you cube any negative number you always get a negative number."

(b) James is right.
Explain why.

A negative × negative = positive, and positive × negative = negative

(2)

(Total for Question 14 is 3 marks)

15 There are some blue counters, red counters and green counters in a bag.
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 number of red counters to the number of green counters.

Let green = 1. Then red = 3, and blue = $2 \times 3 = 6$ → 6 : 3 : 1

6 : 3 : 1

(Total for Question 15 is 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 $\frac{2}{3}$ and $\frac{5}{8}$ are greater than $\frac{1}{2}$, so their sum must be greater than 1, whereas $\frac{7}{11} < 1$.

(Total for Question 16 is 1 mark)

17

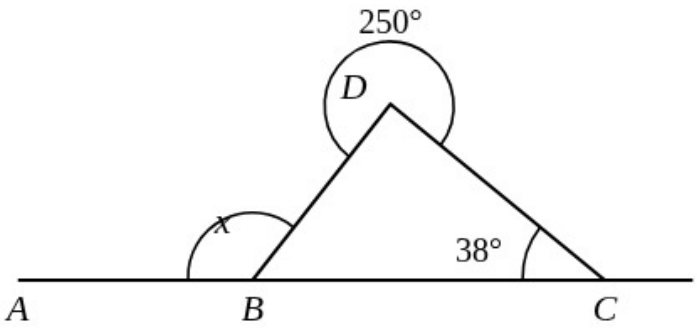


Diagram NOT accurately drawn

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

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

Interior angle BDC = 360° − 250°

= 110° (angles around a point add to 360°)

Angle CBD = 180° − 110° − 38°

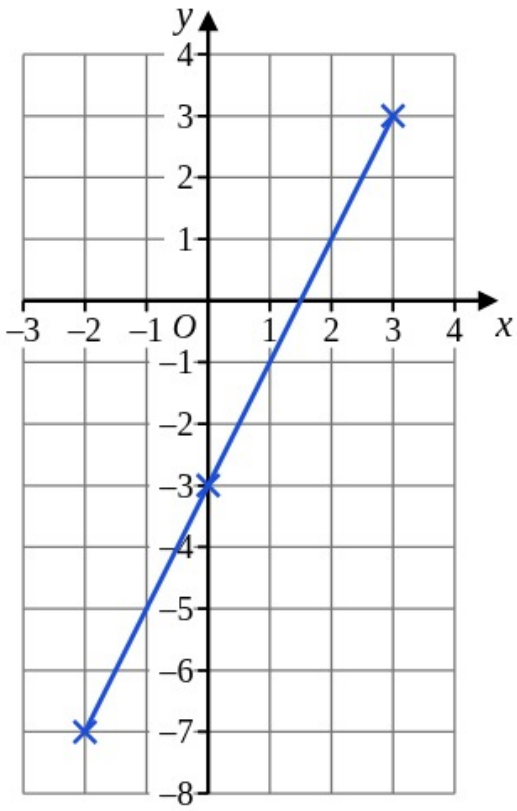
= 32° (angles in a triangle add to 180°)

Exterior angle x = 180° − 32°

= 148° (angles on a straight line add to 180°).

(Total for Question 17 is 4 marks)

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



Points: (–2, –7), (–1, –5), (0, –3), (1, –1), (2, 1), (3, 3)

(Total for Question 18 is 4 marks)

19 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.

19.5 L = 19 500 ml. 19 500 ÷ 210

= 92.86 (or 92 × 210

= 19 320 ml and 93 × 210

= 19 530 ml > 19 500 ml).

(Total for Question 19 is 3 marks)

20 The total cost of 3 apples and 4 pears is £1.84
The total cost of 5 apples and 2 pears is £1.76
Work out the cost of one apple and the cost of one pear.

$3a + 4p = 184$ and $5a + 2p = 176$

$\Rightarrow 10a + 4p = 352$

Subtract: $7a = 168$

$\Rightarrow a = 24p$. $4p = 184 - 72 = 112$

$\Rightarrow p = 28p$

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

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

(Total for Question 20 is 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.

Initially: Red = 90, Blue = 30

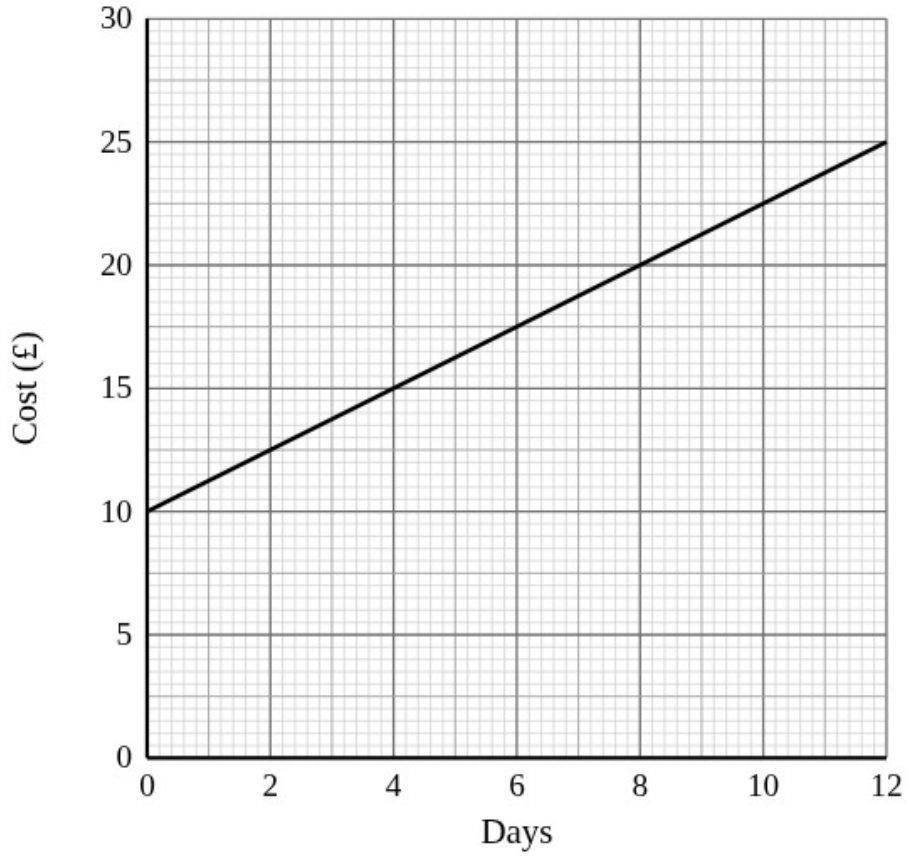
Red left = 90 × (2/3) = 60

Blue left = 30 × 0.20 = 6. Ratio = 60 : 6 = 10 : 1

10 : 1

(Total for Question 21 is 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.

At d = 6, cost = £17.50

£ 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.

(17.50 − 10) ÷ 6 = £1.25/day

£ 1.25

(1)

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

10 + 1.25d = 3d ⇒ 1.75d = 10 ⇒ d = 5.71 days

(3)

(Total for Question 22 is 5 marks)

23

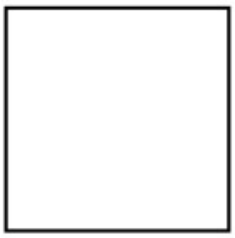


Diagram NOT accurately drawn

A square has sides of length 8.4 cm.
Work out the length of a diagonal of the square.
Give your answer correct to 3 significant figures.

$\sqrt{(8.4^2 + 8.4^2)} = \sqrt{(70.56 + 70.56)}$

$= \sqrt{141.12}$

$= 11.879...$

$= 11.9$ cm (3 s.f.)

11.9 cm

(Total for Question 23 is 3 marks)

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

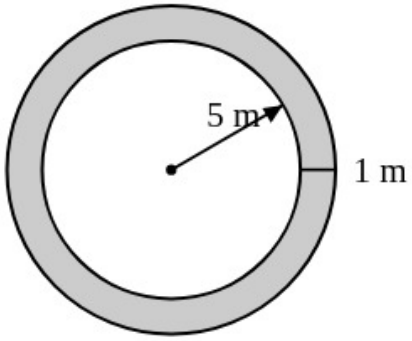


Diagram NOT accurately drawn

The pond has a radius of 5 m.
The path has a width of 1 m.
Work out the area of the path.
Give your answer correct to 3 significant figures.

$\pi \times 6^2 - \pi \times 5^2 = 36\pi - 25\pi$

$= 11\pi$

$= 34.5575...$

$= 34.6$ m² (3 s.f.)

34.6 ..... m²

(Total for Question 24 is 3 marks)

25 Here is a right-angled triangle.

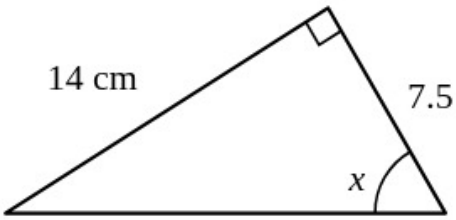


Diagram NOT accurately drawn

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

tan x = 14 / 7.5 = 1.8666...

⇒ x = $\tan^{-1}$(1.8666...) = 61.82° = 62°

62 °

(Total for Question 25 is 3 marks)

26 A box is on a table.

The area of the box in contact with the table is $1500\ \text{cm}^2$.

The pressure on the table is $28\ \text{newtons/m}^2$.

$$p = \frac{F}{A}$$

p = pressure
F = force
A = area

Work out the force exerted by the box on the table.
Give your answer correct to 1 decimal place.

(Pressure = force ÷ area)

1500 cm² = 1500 ÷ 10 000 = 0.15 m²

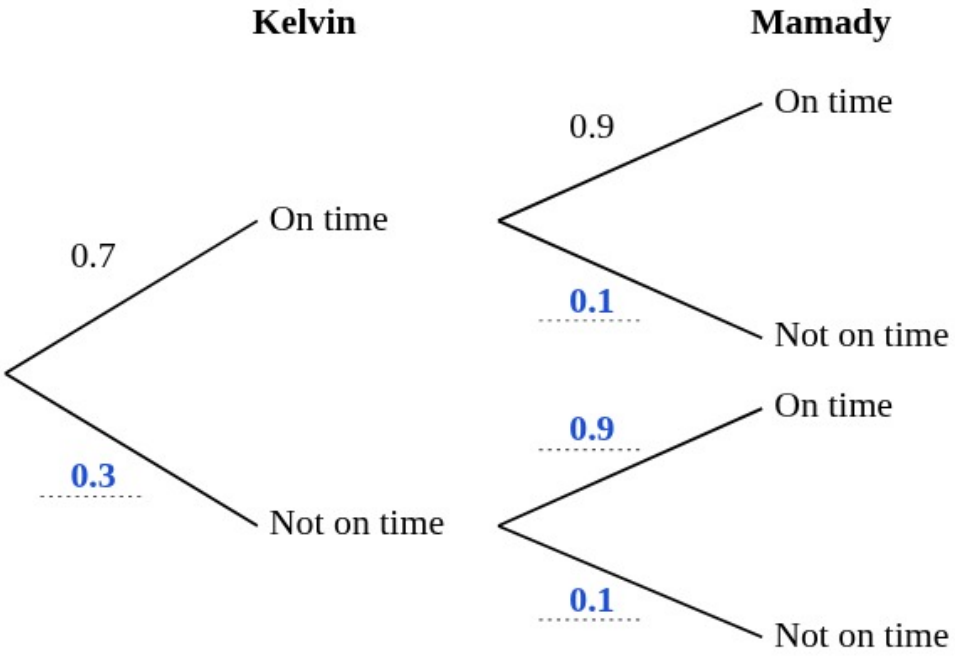
Force F = p × A = 28 × 0.15 = 4.2 newtons

4.2 ..... newtons

(Total for Question 26 is 3 marks)

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.

(a) Complete the probability tree diagram.



$1 - 0.7 = 0.3$

$1 - 0.9 = 0.1$

(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 for Question 27 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS