EPSOM

COLLEGE

ACADEMIC SCHOLARSHIP
MATHEMATICS SAMPLE PAPER

Time Allowed: 45 minutes

Write all answers in the spaces provided

Calculators are not permitted

Q1.

The circumference of a circle is 10 m.

Work out the area of the circle.

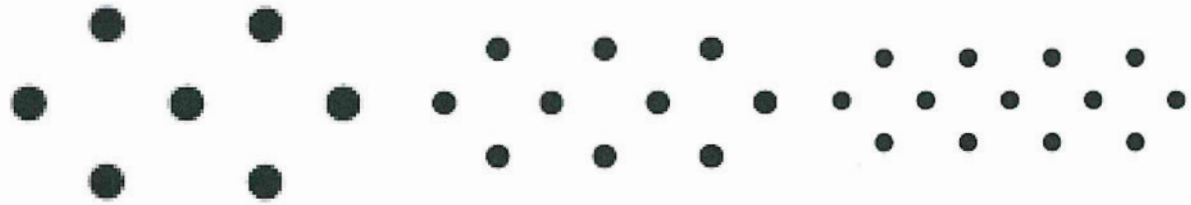
Give your answer in terms of π.

..... m^2

(Total for question = 3 marks)

Q2.

Here are some patterns made from dots.



Pattern number 1 Pattern number 2 Pattern number 3

(a) Draw Pattern number 4 in the space below.

(1)

(b) How many dots are needed for Pattern number 15?

.....

(2)

(Total for Question is 3 marks)

Q3.

A company has a Norwich office and an Ipswich office.

30 people work in the Norwich office
and 20 people work in the Ipswich office.

On Tuesday

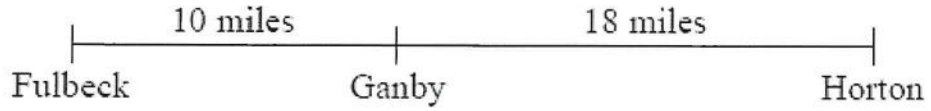
12 people from the Norwich office go to work in the Ipswich office
and 5 people from the Ipswich office go to work in the Norwich office.

Work out how many people should be working in the Norwich office and how many people should be working in the Ipswich office on Tuesday.

(Total for question = 3 marks)

Q4.

The distance from Fulbeck to Ganby is 10 miles.
The distance from Ganby to Horton is 18 miles.



Raksha is going to drive from Fulbeck to Ganby.
Then she will drive from Ganby to Horton.

Raksha leaves Fulbeck at 10 00
She drives from Fulbeck to Ganby at an average speed of 40mph.

Raksha wants to get to Horton at 10 35

Work out the average speed Raksha must drive at from Ganby to Horton.

..... mph

(Total for question = 3 marks)

Q5.

A cube has a total surface area of 150 cm^2

Work out the volume of the cube.

..... cm^3

(Total for question = 4 marks)

Q6.

One uranium atom has a mass of 3.95×10^{-22} grams.

(a) Work out an estimate for the number of uranium atoms in 1kg of uranium.

.....

(3)

(b) Is your answer to (a) an underestimate or an overestimate? Give a reason for your answer.

.....

.....

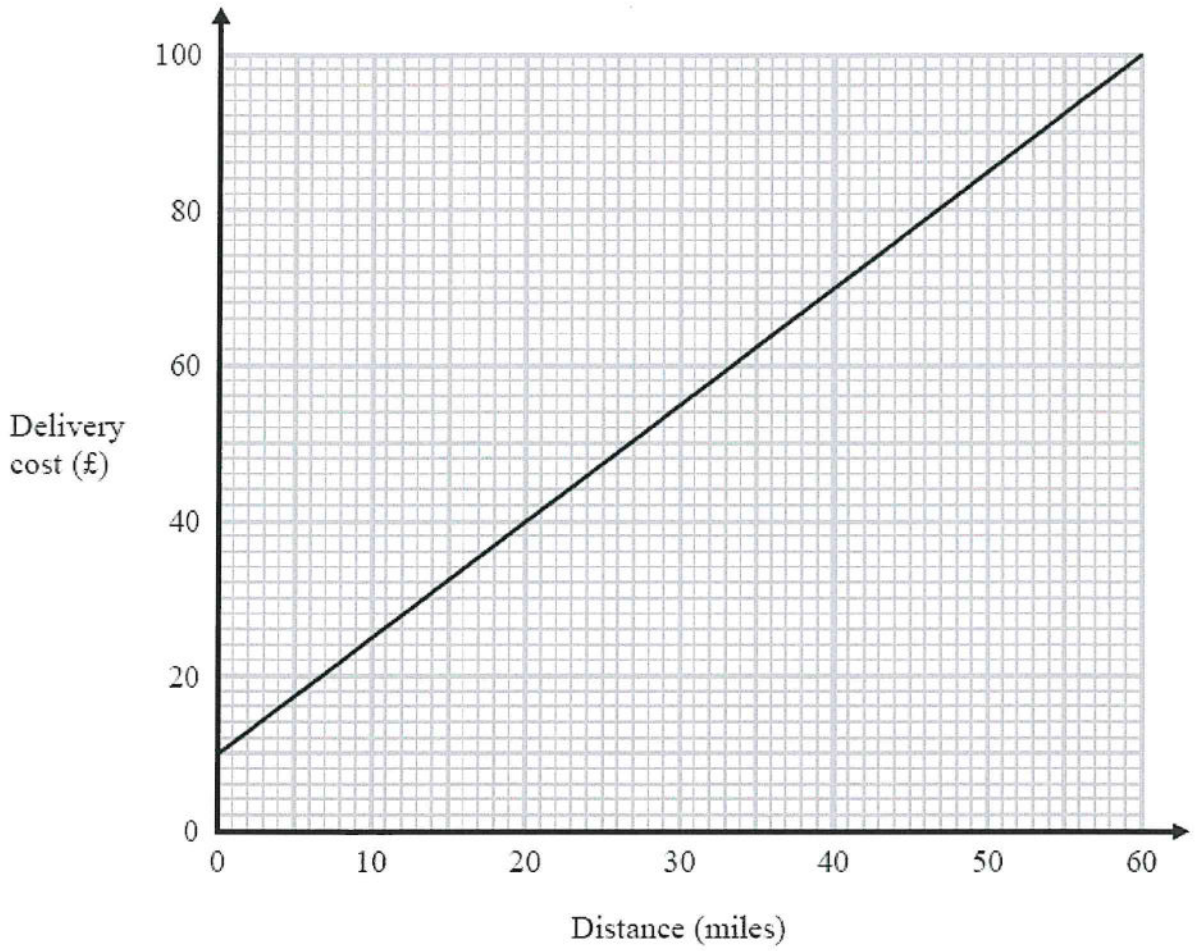
(1)

(Total for question = 4 marks)

Q7.

Tom uses his lorry to deliver bricks.

You can use this graph to find the delivery cost for different distances.



For each delivery, there is a fixed charge plus a charge for the distance.

(a) How much is the fixed charge?

£ .....

(1)

Tom makes two deliveries of bricks.
The distance of one delivery is 20 miles more than the distance of the other delivery.

(b) Work out the difference between the two delivery costs.

£ .....

(2)

(Total for question = 3 marks)

Q8.

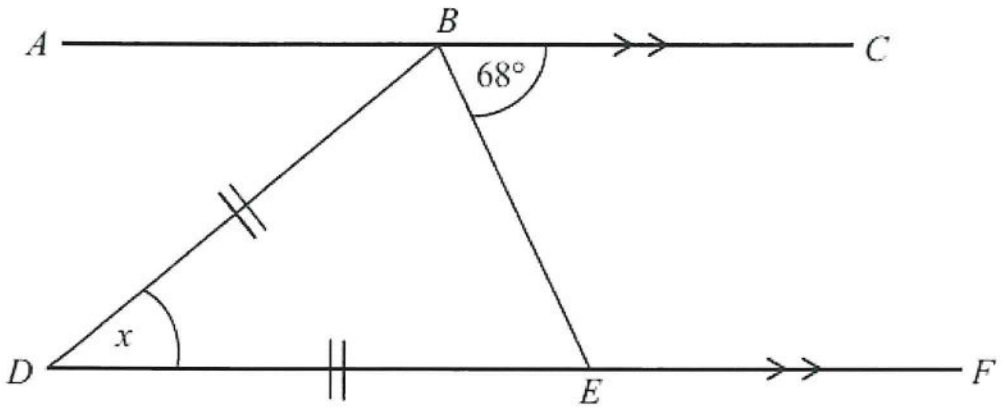


Diagram **NOT** accurately drawn

BDE is an isosceles triangle.
DB = *DE*.
The straight line *ABC* is parallel to the straight line *DEF*.

Work out the size of the angle marked *x*.
You must give reasons for each stage in your working.

(Total for Question is 4 marks)

Q9.

Write down an example to show that each of the following two statements is **not** correct.

(a) The factors of an even number are always even.

.....

(1)

(b) All the digits in odd numbers are odd.

.....

(1)

(Total for question = 2 marks)

Q10.

Rita is going to make some cheeseburgers for a party.

She buys some packets of cheese slices and some boxes of burgers.

There are 20 cheese slices in each packet.

There are 12 burgers in each box.

Rita buys exactly the same number of cheese slices and burgers.

(i) How many packets of cheese slices and how many boxes of burgers does she buy?

..... packets of cheese slices

..... boxes of burgers

Rita wants to put one cheese slice and one burger into each bread roll.

She wants to use all the cheese slices and all the burgers.

(ii) How many bread rolls does Rita need?

..... bread rolls

(Total for Question is 4 marks)

Q11.

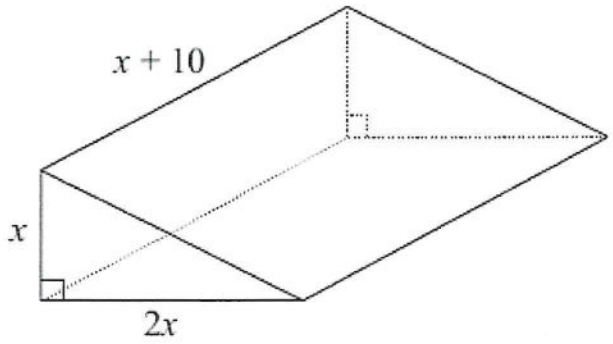


Diagram **NOT** accurately drawn

The diagram shows a solid triangular prism.
All the measurements are in centimetres.

The volume of the prism is V cm^3.

Find a formula for V in terms of x.
Give your answer in simplified form.

.....

(Total for Question is 3 marks)

Q12.

White shapes and black shapes are used in a game.
Some of the shapes are circles.
All the other shapes are squares.

The ratio of the number of white shapes to the number of black shapes is 3:7

The ratio of the number of white circles to the number of white squares is 4:5

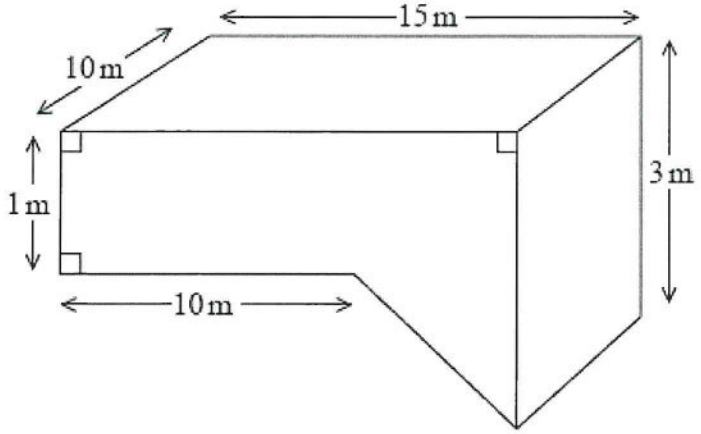
The ratio of the number of black circles to the number of black squares is 2:5

Work out what fraction of all the shapes are circles.

.....

(Total for question = 4 marks)

Q13.



The diagram shows a swimming pool.
The swimming pool is in the shape of a prism.
The swimming pool is filled with water at a rate of 5 litres per second.

Jeremy has 10 hours to fill the swimming pool.
1 m^3 = 1000 litres.

Will he completely fill the swimming pool in 10 hours?
You must show all your working.

(Total for question = 5 marks)

END OF TEST
TOTAL MARKS: 45