



13+ Entrance Examination

Mathematics

Specimen Paper

Time allowed: 40 minutes

Answer all questions in the spaces provided.

Calculators may not be used.

Q1. Work out which distance is longer,

20% of 320 miles or $\frac{1}{2}$ of 130 miles.

You **must** show your working.

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Answer

(Total 4 marks)

Q2.(a) Simplify fully $4a - 3a + 2b - 8b$

.....

.....

.....

Answer

(2)

(b) Factorize $m^2 - 2m$

Answer

(1)

(c) Multiply out $5x(x - 3)$

.....

Answer

(2)

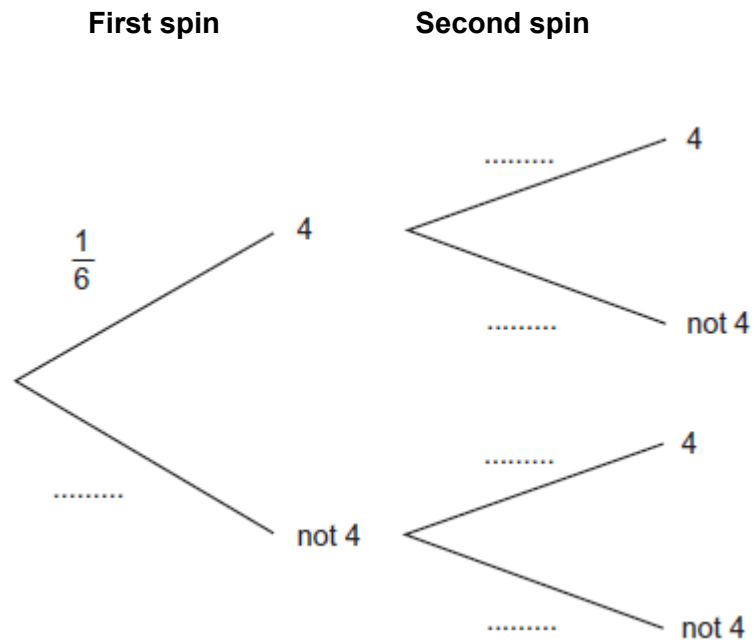
(Total 5 marks)

Q3.

An ordinary fair dice is rolled.



- (a) Complete the tree diagram for the dice landing on 4



(1)

- (b) Work out the probability of the dice landing on 4 both times.

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.....

Answer

(2)
(Total 3 marks)

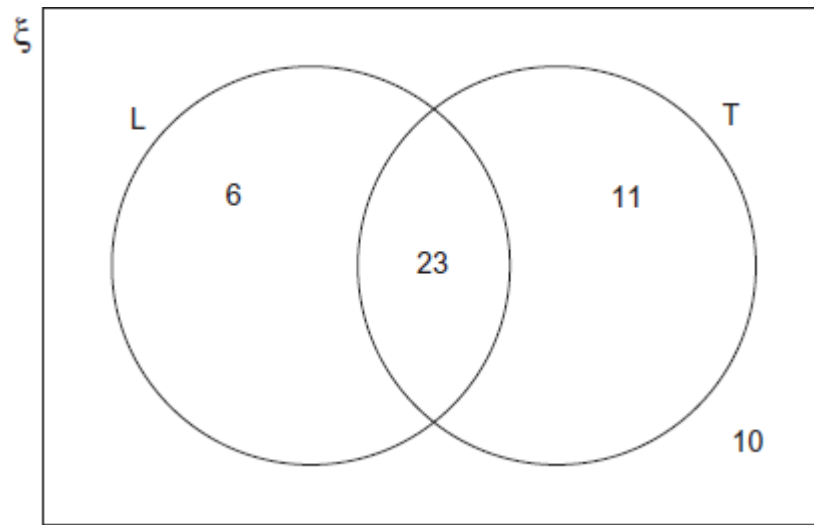
Q4.

Here is a Venn diagram.

It shows information about the number of students who have a laptop or a TV.

Set L represents students with a laptop.

Set T represents students with a TV.



There are 50 students altogether.

A student is chosen at random.

- (a) Work out the probability that the student has a laptop.

Answer

(1)

- (b) Work out the probability that the student has a laptop **and** a TV.

Answer

(1)

- (c) Complete the sentence to make it true.

The probability that the student

.....

..... is $\frac{11}{50}$

(1)

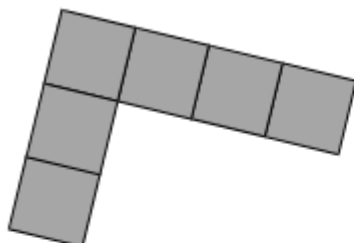
(Total 3 marks)

Q5.

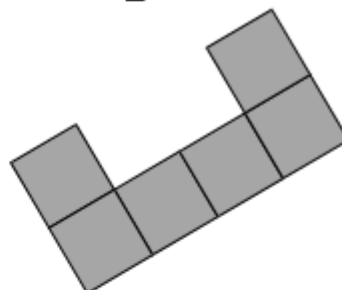
Which of these is the **net** of a **cube**?

Circle the correct letter.

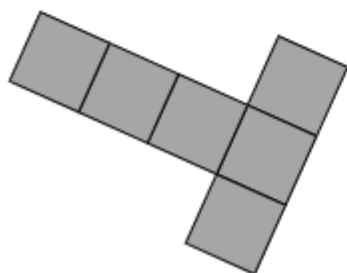
A



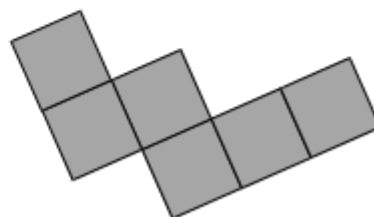
B



C



D



(Total 1 mark)

Q6. Here are three expressions.

$$\frac{b}{a}$$

$$a - b$$

$$ab$$

When $a = 2$ and $b = -6$ which expression has the **lowest** (*furthest left on the number line*) value?

You **must** show your working.

.....

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.....

.....

Answer

(Total 2 marks)

Q7.

Sam wants to buy a camera for £345

He has already saved £96

Each week

his pay is £80

he saves 30% of this pay.

How many **more** weeks must he save?

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.....

.....

Answer weeks

(Total 4 marks)

Q8.

The n th term of a sequence is $2n + 1$

The n th term of a different sequence is $3n - 1$

Work out the **three** numbers that are

in both sequences

and

between 20 and 40

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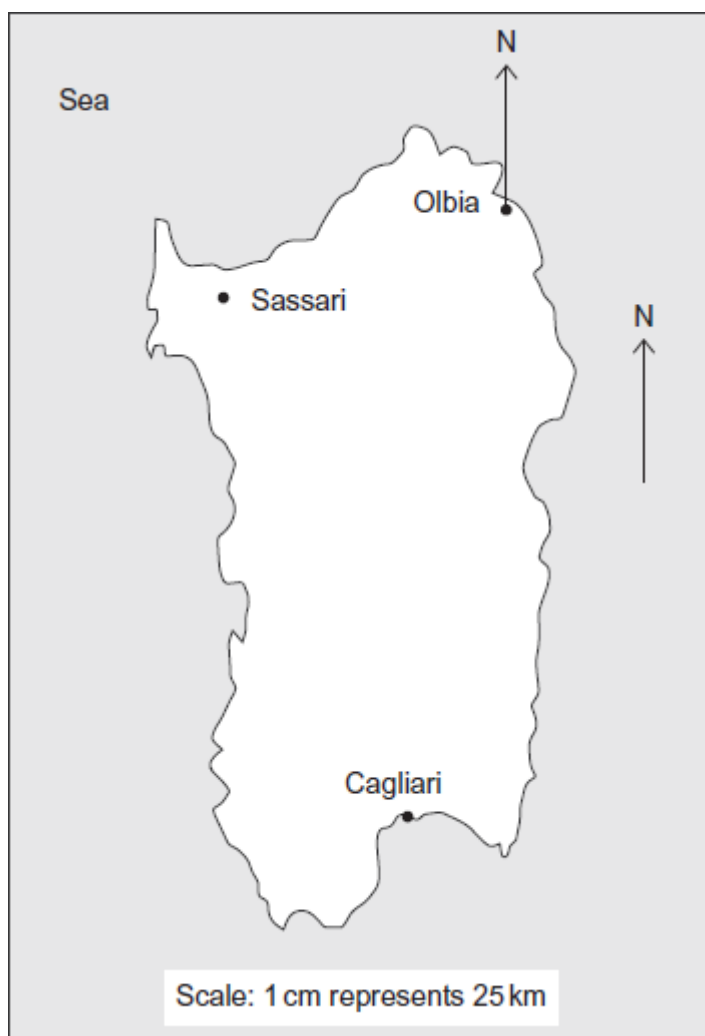
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Answer,,

(Total 3 marks)

Q9. Here is a map of Sardinia.



- (a) Work out the **actual** distance between Cagliari and Sassari.

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.....

.....

Answer km

(3)

- (b) Mario's favorite point along the whole coast is on a bearing of 165° from Olbia.

Draw this bearing **and** mark with a cross the position of this location.

(2)

(Total 5 marks)

Q10.(a) Work out the Highest Common Factor (HCF) of 24 and 42

.....
.....

Answer

(2)

(b) As a product of prime factors $36 = 2^2 \times 3^2$

Write 48 as a product of prime factors.

.....
.....

Answer

(2)

(Total 4 marks)

Q11.(a) The table shows the masses of planets in the form $a \times 10^{24}$ kg

Planet	Mass (kg)
Mercury	0.330×10^{24}
Venus	4.87×10^{24}
Mars	0.642×10^{24}
Jupiter	1900×10^{24}
Saturn	568×10^{24}

Write the mass of Jupiter in kilograms.
Give your answer in standard form.

.....

Answer

(1)

- (b) The mass of the Earth is 5.97×10^{24} kg

The volume of the Earth is 1.02×10^{21} m³

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

Calculate roughly the density of the Earth.

Give your answer to an appropriate degree of accuracy.

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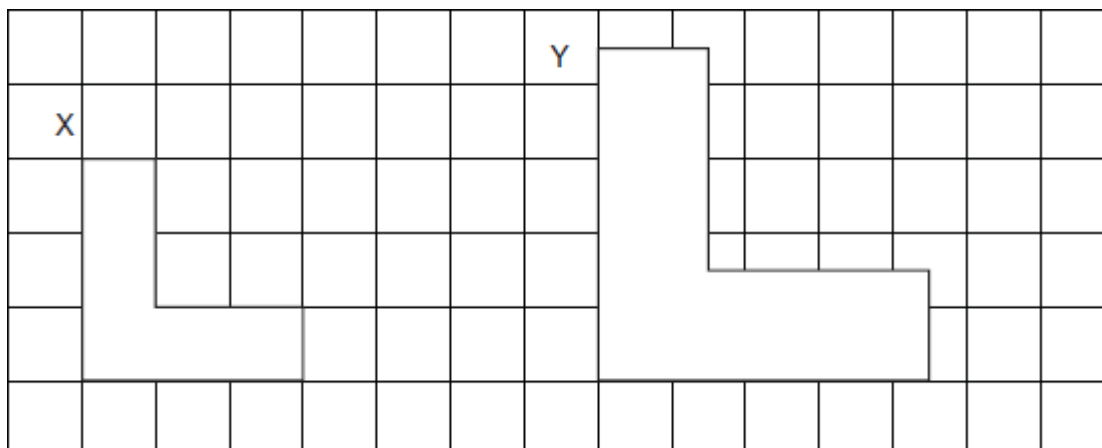
.....

Answer kg / m³

(3)

(Total 4 marks)

Q12.



- (a) Shape Y is an enlargement of shape X.

What is the scale factor of the enlargement?

Answer

(1)

- (b) Shape X has a perimeter of 12 cm.

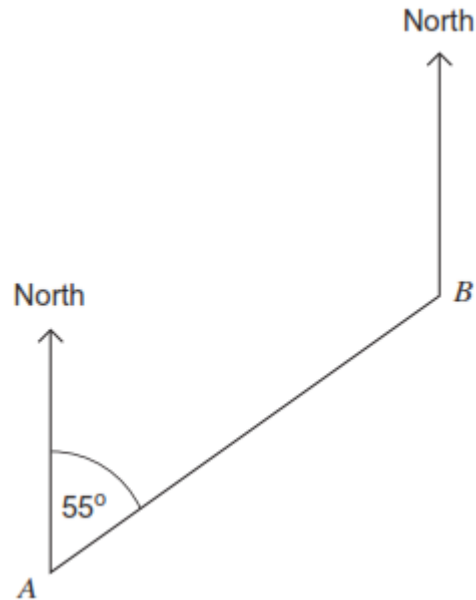
Work out the perimeter of shape Y.

Answer cm

(1)

(Total 2 marks)

Q13. A and B are two towns.



Here is a formula for working out the bearing of A from B .

$$T = F + 180^\circ$$

where T is the bearing of A from B
and F is the bearing of B from A

- (a) Use the diagram and the formula to work out the bearing of A from B .

.....
.....

Answer°

(2)

- (b) Give a reason why the formula can only be used for $0^\circ < F \leq 180^\circ$

.....
.....

(1)

- (c) The bearing of C from D is 342° .

Work out the bearing of D from C .

.....
.....

Answer $^\circ$

(2)
(Total 5 marks)