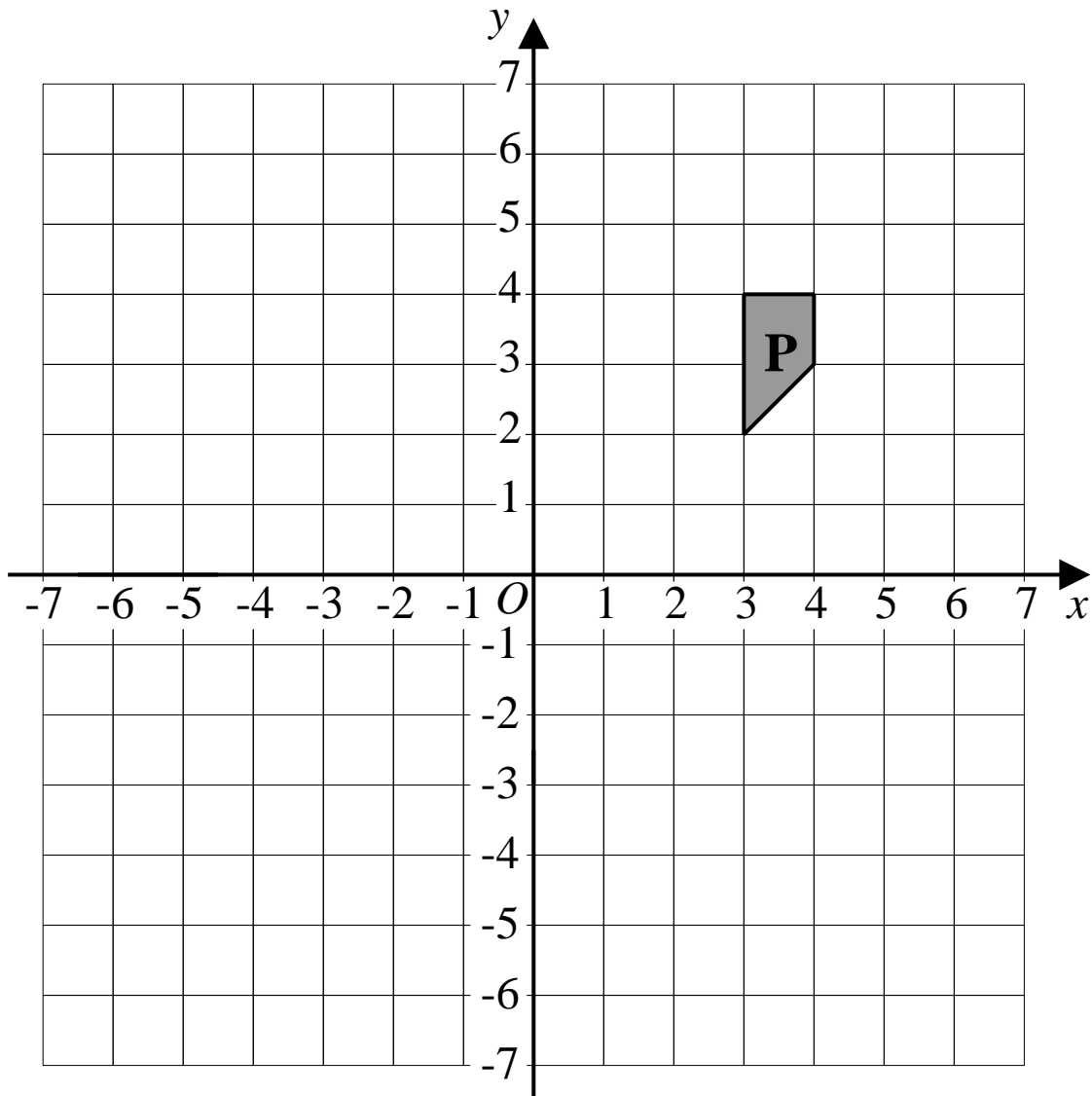# Shrewsbury School

Michaelmas Progress Test
Year 10 : 4th Form

Paper 1
Non-Calculator
Monday 21st November 2022

40 minutes

There are **30** marks available in this paper.
You must show **full working** where appropriate in order to gain full marks.

Question 1

(i)   Translate shape **P** by the vector $\begin{pmatrix} -2 \\ 3 \end{pmatrix}$

Label the new shape **Q**

[2 marks]

(ii)   Rotate shape **P** by 90° about (0, 1)

Label the new shape **R**

[2 marks]

(iii)   Reflect shape **P** in the *x*-axis.

Label the new shape **S**

[1 mark]

Question 2

Here are two 4-sided tetrahedral dice, one purple and one green.
The dice are fair.

Fergus is going to roll each pair of dice once.
Each dice will land on one of the numbers 1, 2, 3 or 4.
Fergus will get his score by adding the two numbers rolled together.

(a) Complete the possibility space diagram for each possible score.

<table>
<tr><td rowspan="2"></td><td rowspan="2"></td><td colspan="4">purple dice</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td rowspan="4">green dice</td><td>1</td><td>2</td><td>3</td><td></td><td></td></tr>
<tr><td>2</td><td>3</td><td></td><td>5</td><td></td></tr>
<tr><td>3</td><td></td><td>5</td><td></td><td></td></tr>
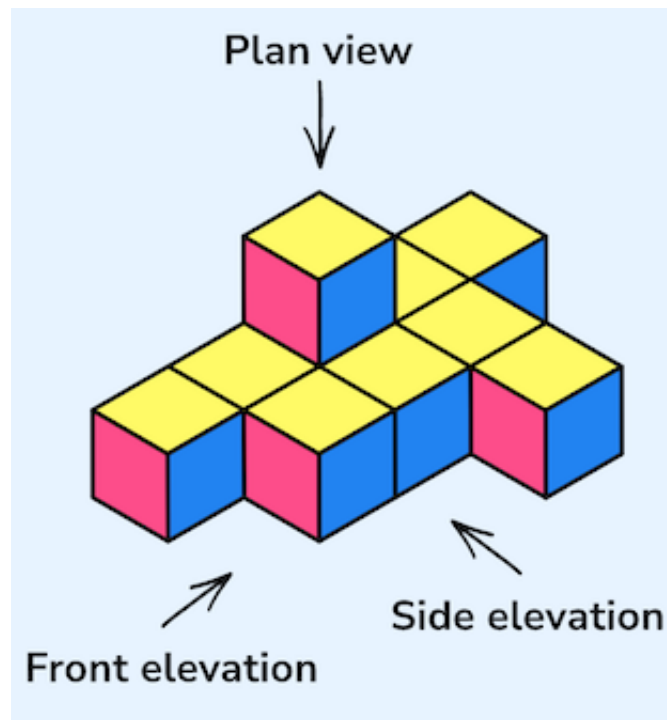<tr><td>4</td><td></td><td></td><td></td><td>8</td></tr>
</table>

[1 mark]

Fergus rolls the pair of dice once.

(b) Find the probability that Fergus gets,

    (i) a total score of 4

[1 mark]

    (ii) a total score of 3 or more
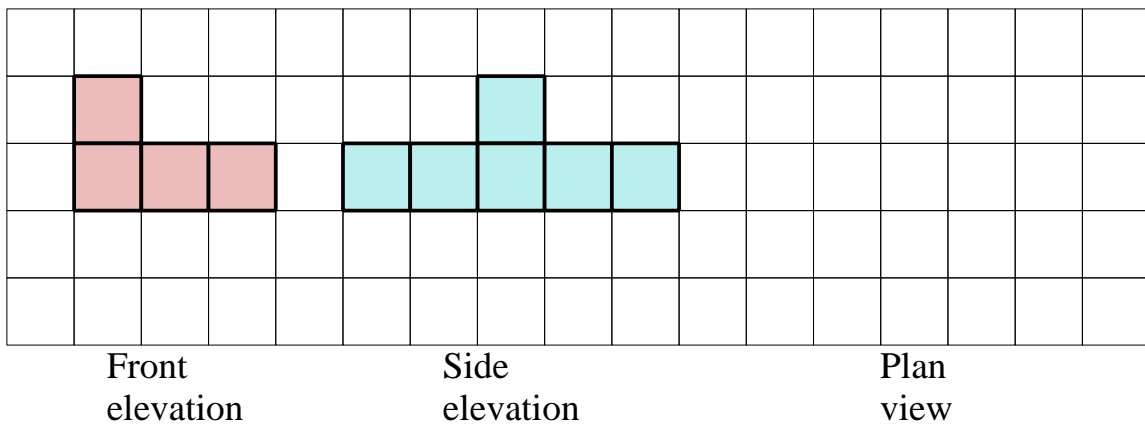
[1 mark]

Question 3

A three dimensional shape is built from ten cubes as shown.

On the grid below the front elevation and the side elevation of the shape have been drawn.

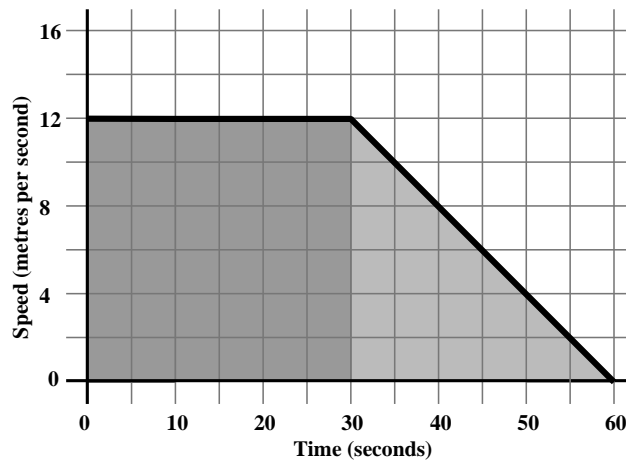Your job is to draw the plan view on the grid.

Front elevation   Side elevation   Plan view

[3 marks]

Question 4

A lorry is following a police car at a constant speed of 12 m/s.
A sign illuminates on the police car saying "follow me".

Thirty seconds after the sign illuminated the police car starts to deceletates at a
constant rate. After a further 30 seconds it stops with the following lorry doing
likewise. Here is the police car's speed-time graph.

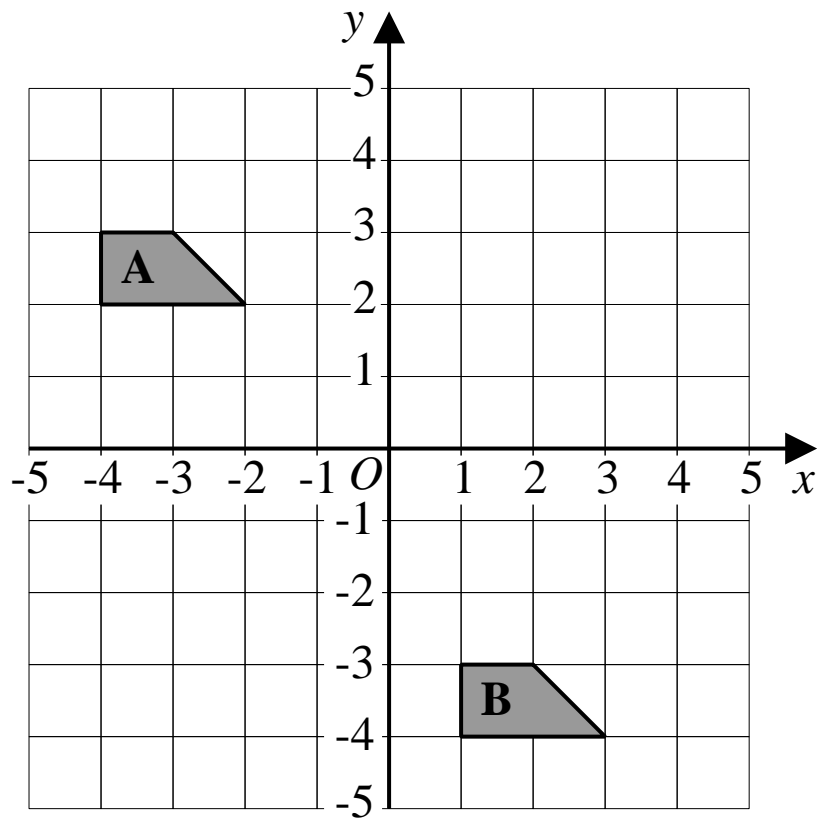**(i)**   Find the distance travelled during the initial 30 second period.

[1 mark]

(ii)   Find the distance travelled when decelerating.

[2 marks]

(iii)   Find the average speed in m/s of the police car during operation "follow me".

[2 marks]

Question 5

Describe the single transformation that maps shape A onto shape B

[2 marks]

Question 6
Three positive whole numbers are all different.
The numbers have a median of 9 and a mean of 7

One possible set of the three numbers is {2, 9, 10}.
What is the other possible set of the three numbers ?

[2 marks]

Question 7

Here are the marks that Leon scored in seven history tests;

16   15   18   18   12   13   20

Find the interquartile range of these marks.

[3 marks]

Question 8

A man jogs 4 km at a steady speed in 50 minutes.

(i)   How many metres is 4 km ?

[1 mark]

(ii)   How many seconds are in 50 minutes ?
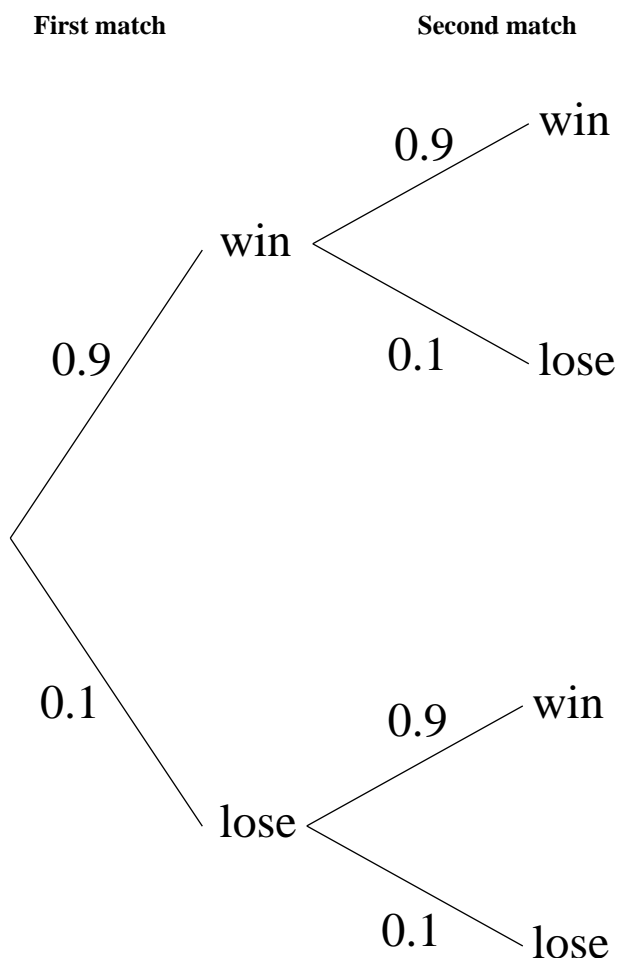
[1 mark]

(iii)   Find the man's speed in m/s

[1 mark]

Question 9

Isaac's team plays two football matches.
The probability that his team will win a match and the probability that they will lose a match are shown in the probability tree diagram.

First match   **Second match**

win

0.9 ╱ win

0.9

0.1 ╲ lose

0.1

lose

0.9 ╱ win

0.1 ╲ lose

(**i**)   Work out the probability that Isaac's team wins both matches.

[2 marks]

(**ii**)   Work out the probability that Isaac's team loses at least one match.

[2 marks]