Year 11
Mathematics
October 2024

Paper M1 Non-Calculator

30 minutes
32 marks

Name	
Teacher	

1. Work out.

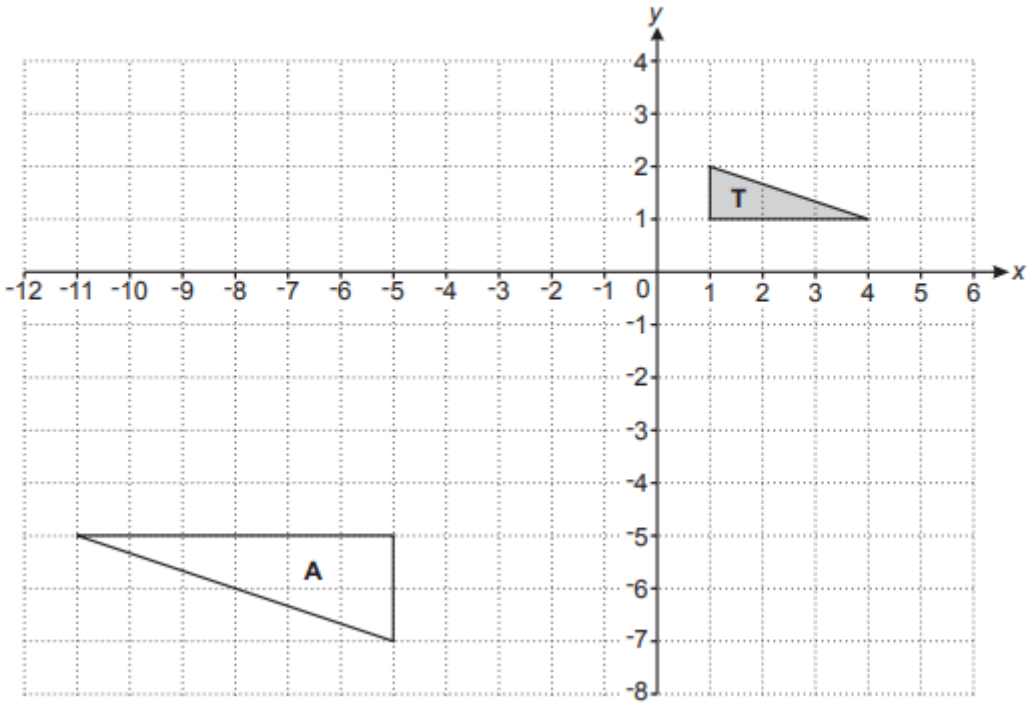
(a) $\begin{pmatrix} 3 \\ -1 \end{pmatrix} + \begin{pmatrix} -2 \\ 4 \end{pmatrix}$

(a) $\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ **[1]**

(b) $\begin{pmatrix} 5 \\ 3 \end{pmatrix} - 2\begin{pmatrix} 1 \\ -4 \end{pmatrix}$

(b) $\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ **[2]**

2. Triangle **T** and triangle **A** are drawn on the coordinate grid.



(a) Describe fully the **single** transformation that maps triangle **T** onto triangle **A**.

.....

..... **[3]**

(b) Describe fully the **single** transformation that is equivalent to:

- a rotation of 90° clockwise about centre (0,0), followed by
- a reflection in the *y*-axis.

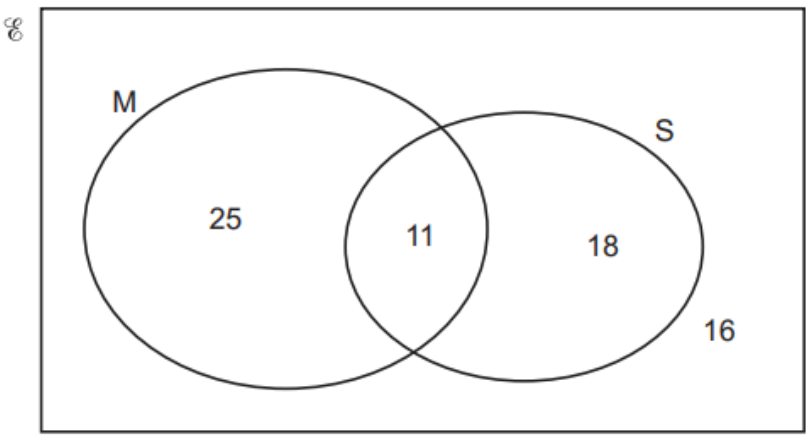
You may use the grid above to help you.

.....

..... **[3]**

3. A cafe owner recorded information about customer orders for coffee.
They recorded whether the customer asked for milk (M) and whether the customer asked for sugar (S).

The results are shown in this Venn diagram.



(a) One of the customers is chosen at random.

Find the probability that the customer asked for sugar.

(a) ..... **[2]**

(b) One of the customers is chosen at random.

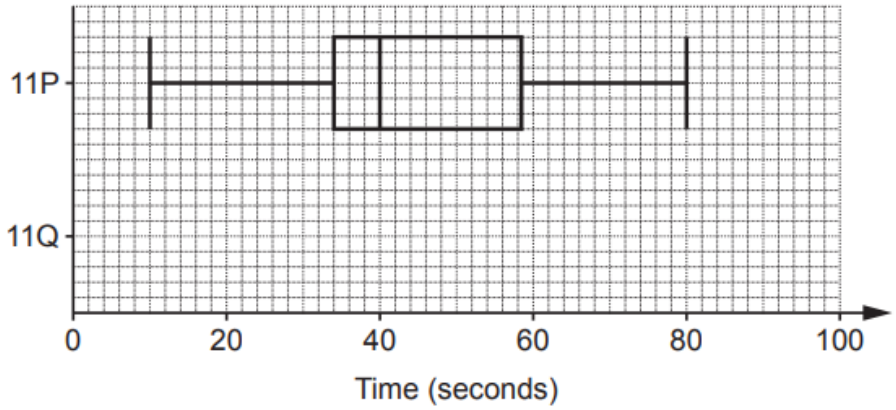
Find the probability that the customer asked for sugar given that they asked for milk.

(b) ..... **[2]**

4. Write down an equation for the line that is parallel to $y = 3x - 5$ and passes through the point $(0, 1)$.

..... **[2]**

5. The box plot shows the distribution of the times, in seconds, taken by class 11P to complete a problem.



(a) The times, in seconds, taken by class 11Q to complete the same problem are summarised below.

- median = 52
- lower quartile = 42
- interquartile range = 18
- range = 70
- highest score = 86

Show the distribution of 11Q's times as a box plot on the diagram above. **[3]**

(b) Which class has the more **consistent** times?
Give a reason for your answer.

..... because .....

..... **[1]**

6. y is directly proportional to the cube of x.

Complete the table.

x	1	2	
y	7		875

[4]

7. Riley has a set of cards.
Each card has a triangle or circle drawn on it and is coloured red or blue.

The table gives some information about the number of each type of card.

	Number of cards with a triangle	**Number of cards with a circle**
Number of blue cards	3	8
Number of red cards	9	2

Riley chooses three of these cards at random without replacement.
All three of these cards have a circle drawn on them.

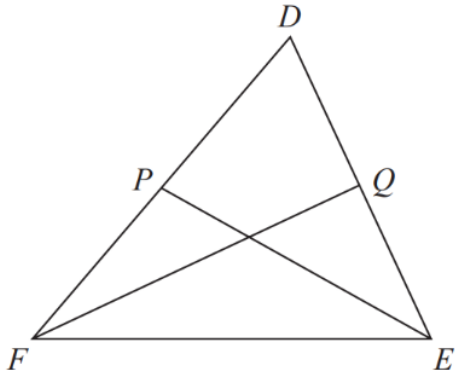
Riley says

The probability that two of these three cards are blue and one is red is less than $\frac{1}{2}$.

Is Riley correct?
You must show your working.

..... **[5]**

8. *DEF* is a triangle.



P is the midpoint of *FD*.
Q is the midpoint of *DE*.

$\overrightarrow{FD} = \mathbf{a}$ and $\overrightarrow{FE} = \mathbf{b}$

Use a vector method to prove that *PQ* is parallel to *FE*.

[4]

Total Marks 32