EXAMINATIONS COUNCIL OF ESWATINI
Junior Certificate Examination

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

MATHEMATICS **309/02**

Paper 2 **October/November 2024**

Candidates answer on the Question Paper. **2 hours 30 minutes**

Additional materials required: Geometrical Instruments
3-figure tables

READ THESE INSTRUCTIONS FIRST

Write your name, centre number and candidate number in the spaces provided.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams, graphs or rough working.
Do **not** use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

All working should be clearly shown below each question.
The number of marks is given in brackets [ ] at the end of each question or part question.

Calculators should **not** be used.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures.
Give answers in degrees to one decimal place.
3-figure tables may be used in any question where necessary.
The total of the marks for this paper is 100.

For Examiner's Use	
1	
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11	
Total	

This document consists of **18** printed pages and **2** blank pages.

1 **(a)** Given that M = {counting numbers from 26 to 45}

Find

(i) a square number,

Answer (a)(i) ....…… [1]

(ii) a cube number,

Answer (a)(ii) ……...……. [1]

(iii) a factor of 62,

Answer (a)(iii) ……..……. [1]

(iv) the LCM of 6 and 7.

Answer (a)(iv)……. [1]

(b) Express 180 as a product of its prime factor.

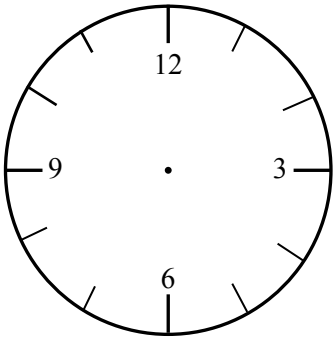
Answer (b) ….……. [2]

(c) For each of the following statements, insert a pair of brackets to make it correct.

(i) $4 + 20 - 5 \div 3 = 9$ [1]

(ii) $25 - 2 \times 4 - 8 = 33$ [1]

2 Ryan cycled to school from home.
He left home at 0635 hours and he took 30 minutes to cycle to school.



(a) **(i)** Complete the clock diagram to show the time he reached school. [1]

(ii) The distance from home to school is 4 km.

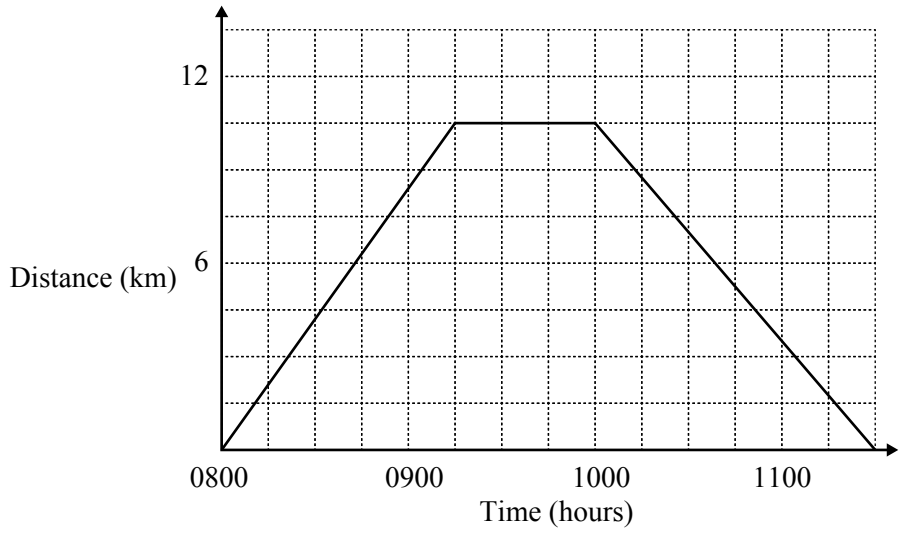
Calculate Ryan's average speed

Answer (a)(ii)……km/h [2]

[Turn over

(b) On another day, Ryan cycled to Jake's house.

The distance-time graph shows the journey taken by Ryan from his home and back.



(i) Find the distance travelled by Ryan to Jake's house.

Answer (b)(i) …… km [1]

(ii) Find the time spent by Ryan at Jake's house.

Answer (b)(ii) …… min [1]

(iii) Find the time Ryan took on his return journey.

Answer (b)(iii)……hours ……min [2]

3 **(a)** A bus carries 72 passengers.
The ratio of men to women is 4 : 5.

(i) Find the number of men in the bus.

Answer (a)(i)..... [2]

(ii) The bus has 16 standing passengers.

Write down the number of standing passengers as a fraction, in its simplest form.

Answer (a)(ii)..... [2]

(b) The conversion ratio between Emalangeni and Euros is € 1 : E20.
A passenger paid E70 bus fare.

Calculate the amount paid by the passenger in Euros.

Answer (b) €..... [2]

(c) In the bus, there were 3 different nationalities.
There were Swazis, South-Africans and British.
The ratio of British to South-Africans is 1 : 2.
The ratio of South-Africans to Swazis is 1 : 3.

(i) Find the ratio of British to Swazis.

Answer (c)(i) ..... [2]

(ii) Hence find the number of Swazis.

Answer (c)(ii) ..... [2]

4 **(a)** Factorise.

$4x^2y - xy^2$

Answer (a) ..... [2]

(b) Simplify

(i) $\frac{12f^3g^3}{4f^7g}$,

Answer (b)(i) ..... [2]

(ii) $\frac{5x-4}{3} - \frac{2x-5}{2}$.

Answer (b)(ii) ..... [3]

(c) Solve.

$\frac{y}{4} = \frac{3-y}{3}$

Answer (c) ..... [3]

(d) Expand and simplify.
$2(3x + 1) + 4(3x - 2)$

Answer (d) ..... [2]

(e) Work out, leaving your answer in standard form.

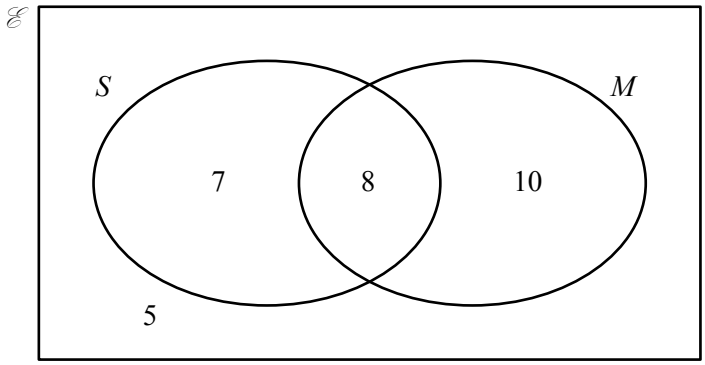
$(2.3 \times 10^4) + (3.1 \times 10^3)$

Answer (e) ..... [2]

[Turn over

5 **(a)** There are 30 learners in a class.

Some study science (S) and some study mathematics (M).
The Venn diagram shows the number of learners in each set.



A leaner is chosen at random from the class.

Find the probability that the learner studies

(i) mathematics and science,

Answer (a)(i) ..... [1]

(ii) only one subject,

Answer (a)(ii) ..... [1]

(iii) neither mathematics nor science.

Answer (a)(iii) ..... [1]

(b) Given that vector $\mathbf{m} = \begin{pmatrix} -3 \\ -5 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} 6 \\ 2 \end{pmatrix}$.

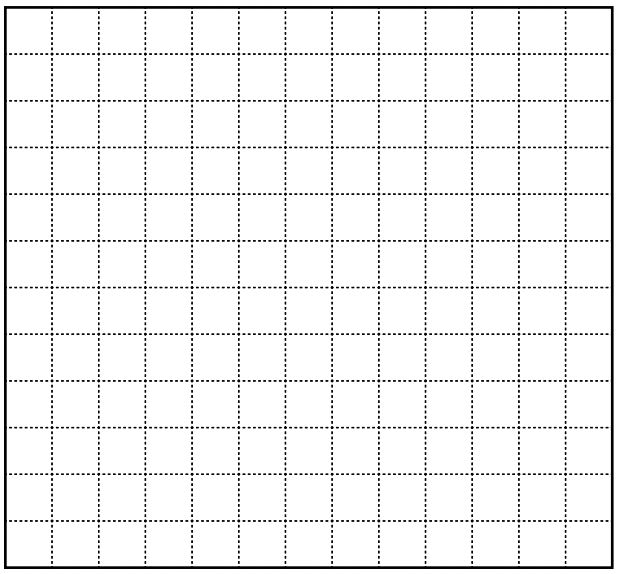
(i) Work out.

$3\mathbf{m} - \mathbf{b}$

Answer (a)(i) ..... [3]

(ii) Given that vector $\mathbf{c} = \begin{pmatrix} 3 \\ -3 \end{pmatrix}$.

On the grid, show that $\mathbf{m} + \mathbf{b} = \mathbf{c}$.



[4]

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6 The equation of a straight line is given by $y = 6 - \frac{2}{3}x$.

(a) State the

(i) gradient of the line,

Answer (a)(i) ..... [1]

(ii) y – intercept.

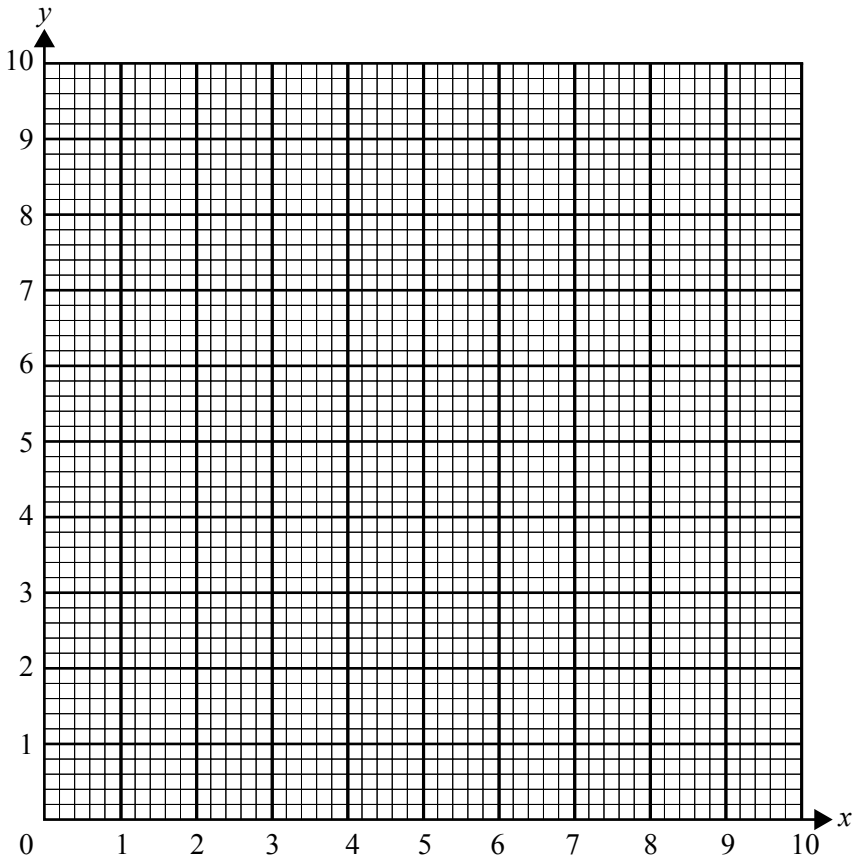
Answer (a)(ii) ..... [1]

(b) Complete the table for the equation $y = 6 - \frac{2}{3}x$.

x	0	6	9
y	6		

[2]

(c) On the grid below, draw the line $y = 6 - \frac{2}{3}x$.



[2]

(d) On the same grid, draw a horizontal line through (6, 4). [1]

(e) Hence, state the coordinates of the point of intersection of the lines in **(c)** and **(d)**.

Answer (e) ...…….....……. [1]

7 Solve.

(a) $14 = 4 + 5x$

Answer (a) ..... [2]

(b) $13 - 4x \leq 33$

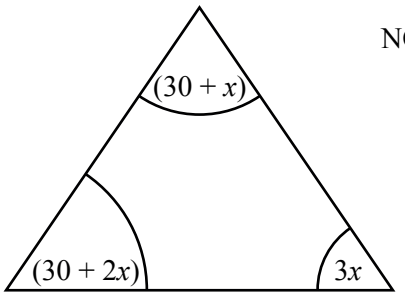
Answer (b) ..... [2]

(c) $\frac{2x+4}{5} + \frac{x-1}{2} = 3$

Answer (c) ..... [3]

[Turn over

(d) The angles of a triangle are $(30 + x)°$, $(30 + 2x)°$ and $3x°$.



NOT TO SCALE

(i) Form an equation in terms of x.

Answer (d)(i) ..... [1]

(ii) Solve the equation to find the value of x.

Answer (d)(ii) ..... [2]

8 A ship leaves port *A* on a bearing of 070° and sail for 120 km to port *B*.
It then leaves port *B* on a bearing of 120° and sail 160 km to port *C*.

(a) Using a scale of 1 cm to represent 20 km.
Make a scale drawing for the journey.

[4]

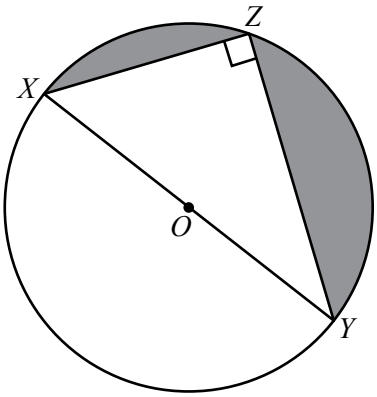
(b) Find the bearing of port *A* from port *C*.

Answer (b) ……° [2]

(c) Find the actual distance between port *A* and port *C* in kilometres.

Answer (c) ……km [2]

9 The diagram shows a circle, centre O.
The points, X, Y and Z lie on the circumference of the circle.
$XY = 10\,\text{cm}$, $XZ = 6\,\text{cm}$.
$X\hat{Z}Y = 90°$.



NOT TO SCALE

(a) Show that $YZ = 8\,\text{cm}$.

[2]

(b) Use trigonometry to calculate $Y\hat{X}Z$.

Answer (b) ……[2]

(c) Work out the area of the shaded region. (use $\pi = 3.14$)

Answer (c) ..... [4]

10 The table shows the shoe sizes of 50 pupils in a Form 3 class.

Shoe sizes	Frequency
3	8
4	10
5	10
6	14
7	5
8	3
Total	**50**

(a) Find

(i) mode,

Answer (a)(i) ...…….…… [1]

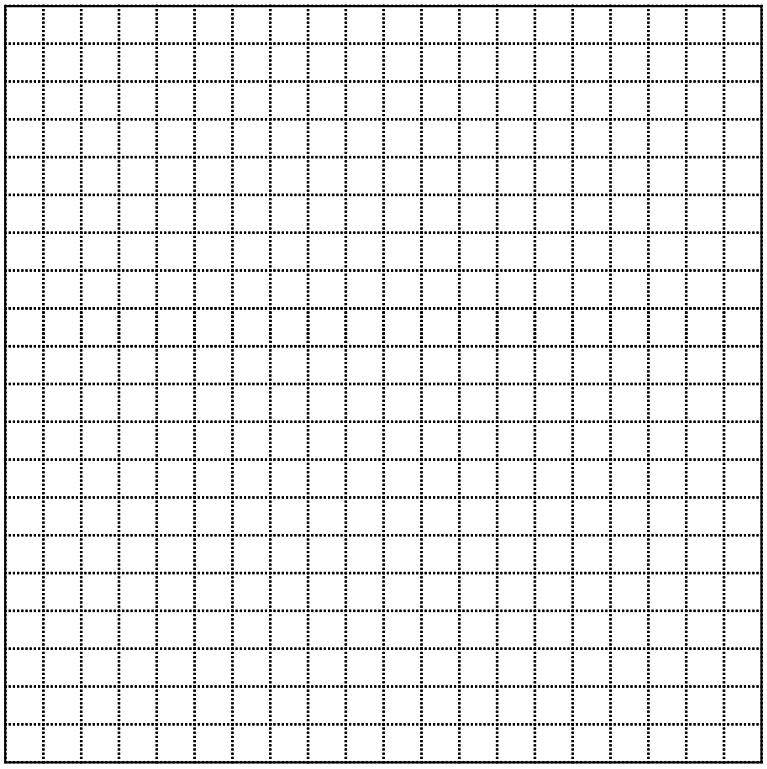
(ii) median,

Answer (a)(ii) ...…….…...…… [2]

(iii) mean.

Answer (a)(iii) ...…….……..… [3]

(b) Draw a bar chart to represent the information on the table.



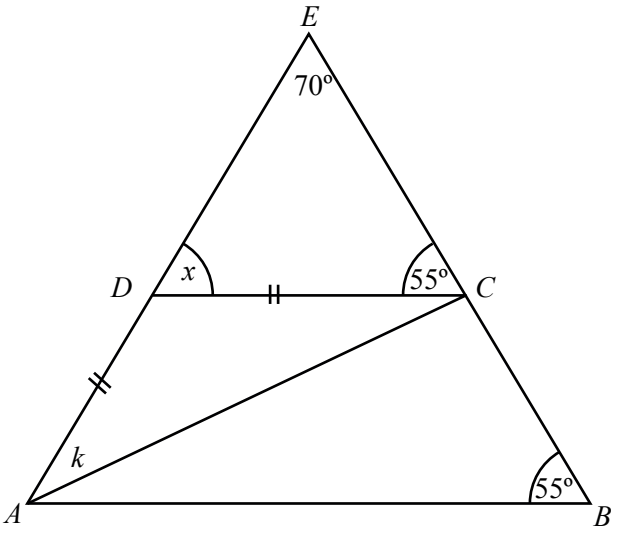
[4]

(c) A pupil is chosen at random from the class.

Find the probability that the shoe size of the pupil is 10.

Answer (c) ..... [1]

11 The diagram shows triangle *ABE*.
ADE and *BCE* are straight lines.
Angle *DEC* = 70° , angle *CBA* = angle *ECD*.
AD = *DC*.



NOT TO SCALE

(a) Using the diagram, write down

(i) a pair of parallel lines,

Answer (a)(i) ..... and ..... [1]

(ii) a pair of corresponding angles.

Answer (a)(ii) ..... and ..... [1]

(b) Find angle

(i) *x*

Answer (b)(i) ..... [1]

(ii) *k*

Answer (b)(ii) ..... [2]

(c) Name the quadrilateral *ABCD*.

Answer (c) ..... [1]

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