



EXAMINATIONS COUNCIL OF ESWATINI  
Junior Certificate Examination

CANDIDATE  
NAME

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CENTRE  
NUMBER

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CANDIDATE  
NUMBER

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**MATHEMATICS**

**309/01**

Paper 1

**October/November 2021**

**2 hours**

Candidates answer on the Question Paper.

Additional materials: Geometrical Instruments

Tracing paper (optional)

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on the spaces provided.

Write in dark blue or black pen in the spaces provided on the Question Paper.

You may use a pencil for any diagrams or graphs.

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**

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

- 1 (a) The place value of 6 in the number 647.4 is hundreds.

Write the place value of 6 in the following numbers.

(i) 0.0567

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

(ii) 0.612

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

- (b) Arrange the following numbers in order of size starting with the smallest.

0.33                  40%                  0.44                   $\frac{1}{3}$

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

- 2 Fill in the missing values in the table.

Fraction	Decimal	Percentages
$\frac{2}{5}$	$a$	$b$
$c$	0.09	9%
$d$		12.5%

Answer  $a =$  ..... [1]

$b =$  ..... [1]

$c =$  ..... [1]

$d =$  ..... [2]

3 Given the expression  $3x^2 + 4x - 1$ ,

(a) state the number of terms in the expression,

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

(b) state the constant term in the expression,

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

(c) calculate the value of the expression if  $x = -2$ .

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

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4 The probability that a school team wins a match is  $\frac{3}{5}$ .

(a) Find the probability that the team loses a match.

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

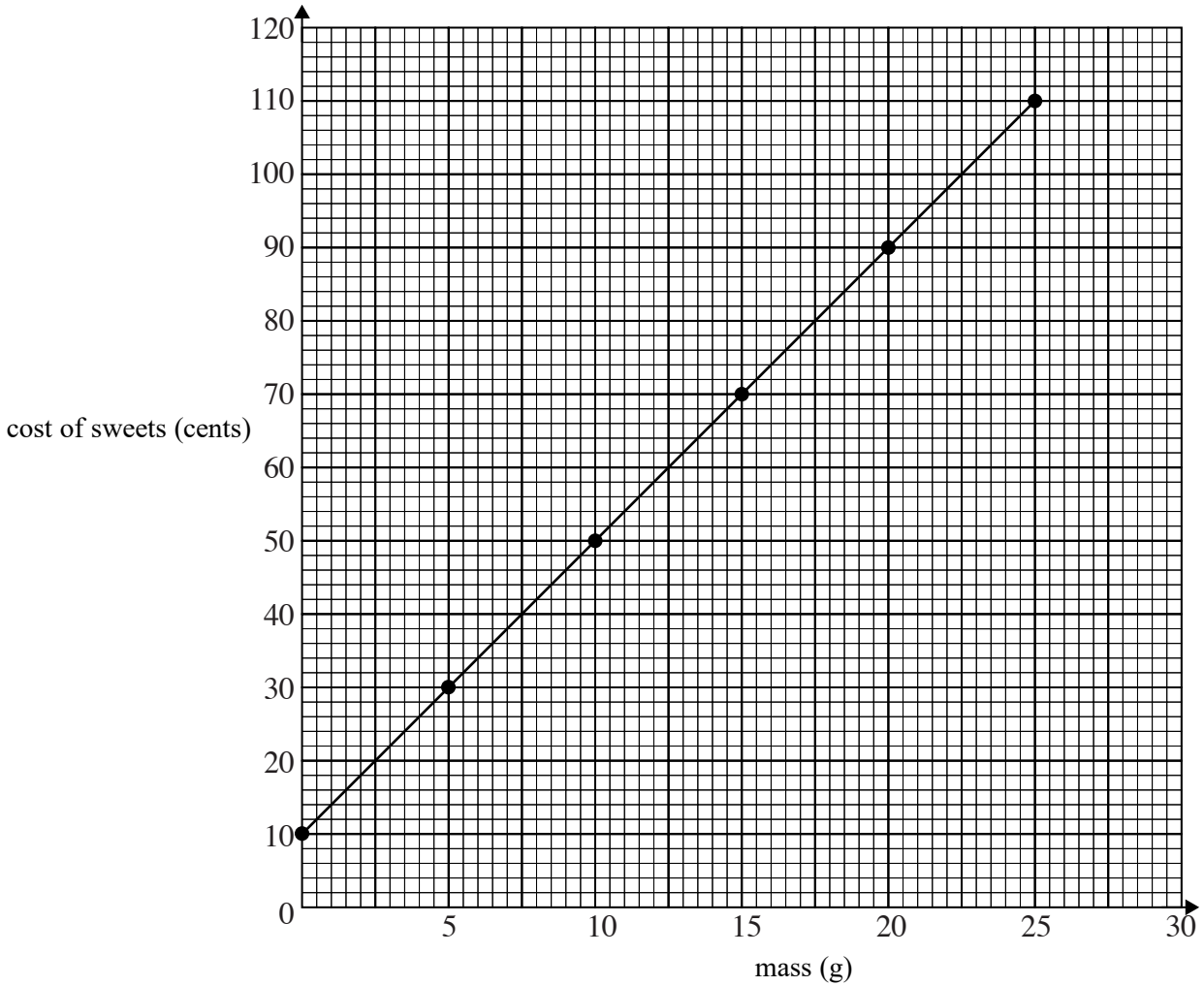
(b) The school team plays 60 matches.

Find the number of times the school team is expected to win a match.

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

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5 The graph shows the cost of sweets against their mass in grams.



(a) Use the graph to find the cost of sweets weighing 20g.

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

(b) Use the graph to find the mass of sweets costing 56 cents.

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

6 (a) Find the lowest common multiple of 6 and 8.

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

(b) Express 54 as product of its prime factors.

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

(c) Work out.

(i)  $3 \times 4 - 5 + 8 \div 4$

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

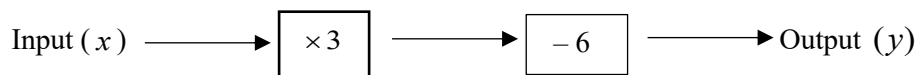
(ii) 
$$\frac{43 + 37}{-4 + 7}$$

Give your answer to **2 decimal places**.

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

7 A mapping multiplies the input by 3 and then subtract 6.

When the input is  $x$  the output is  $y$ .



(a) Write an equation for the mapping.

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

(b) Work out the value of  $x$  when  $y = 9$ .

Answer (b)  $x =$ ..... [3]

- 8 Consider the number sequence

$$-18, \quad -13, \quad -8, \quad -3, \dots$$

- (a) State the rule for this sequence.

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

- (b) Find the next two terms of the sequence.

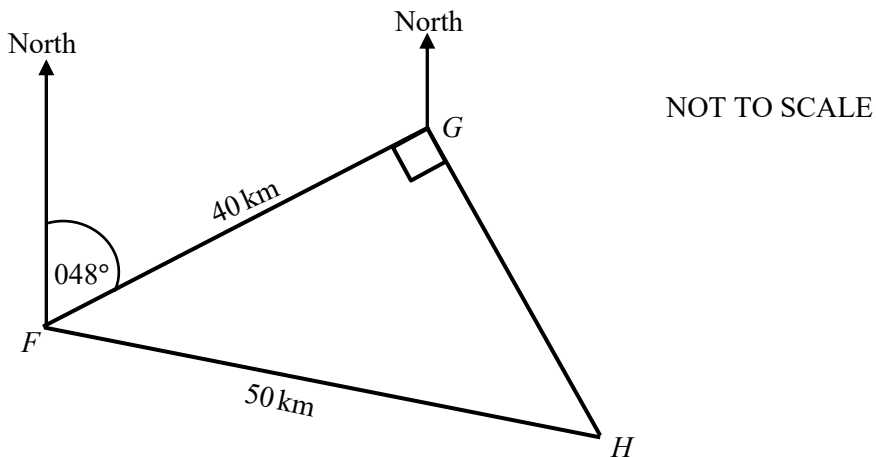
Answer (b) ..... [2]

- 9 The diagram below shows a position of three towns,  $F$ ,  $G$  and  $H$ .

Town  $G$  is 40 km away from town  $F$ .

Town  $H$  is 50 km from town  $F$ .

The bearing of town  $G$  from town  $F$  is  $048^\circ$ .



Calculate the bearing of

- (a) town  $F$  from town  $G$ ,

Answer (a)..... $^\circ$  [2]

(b) town  $H$  from town  $G$ .

Answer (b) .....° [2]

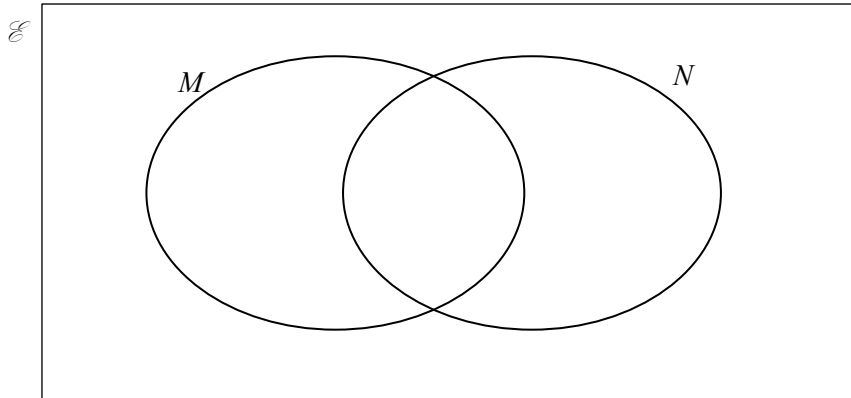
10 Given

$$\mathcal{E} = \{1, 2, 3, 4, \dots, 10\}$$

$$M = \{\text{Prime numbers}\}$$

$$N = \{\text{Odd numbers}\}$$

(a) Complete the Venn Diagram to fill the given information.



[4]

(b) Find

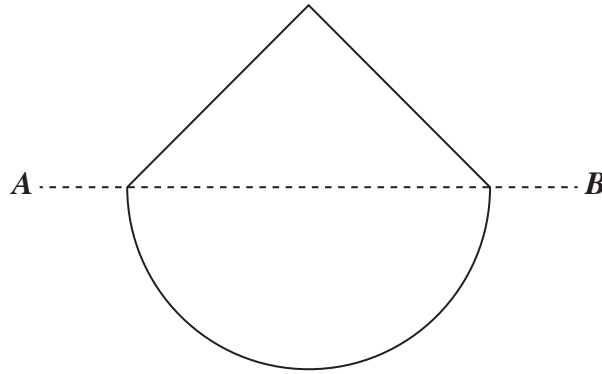
(i)  $M \cap N$ ,

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

(ii)  $n(M \cup N)$ .

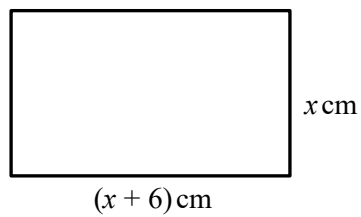
Answer (b)(ii) ..... [1]

- 11 Complete the figure such that the line  $AB$  is a line of symmetry.



[2]

- 12 The figure below shows a rectangle.  
The length of the rectangle is  $(x + 6)$  cm.  
The width is  $x$  cm.



Given that the perimeter of a rectangle is 32 cm,

Calculate the value of  $x$

Answer  $x = \dots\dots\dots$  [3]



13 Sihle and Lihle are sisters.

Sihle obtained 60% and Lihle obtained 80% in a mathematics test.

(a) Write down the marks obtained by the sisters as a ratio in its simplest form.

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

(b) Their mother decided to award them E210 according to the ratio of their marks.

Calculate Lihle's share.

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

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14 (a) Simplify the following, leaving your answer in its simplest form.

(i)  $a^7 \div a^9$

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

(ii)  $m^7 n^5 \times \frac{1}{m^3 n^7}$

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

(b) Simba changes E13 950 to dollars, when the exchange rate is,  
\$1 = E15.50.

Calculate how much Simba received in dollars.

*Answer (b) \$..... [2]*

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- 15 (a) Express as a single fraction.

$$\frac{2y}{5} - \frac{y}{10}$$

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

- (b) Solve the inequality.

$$2 - 3a \leq 8$$

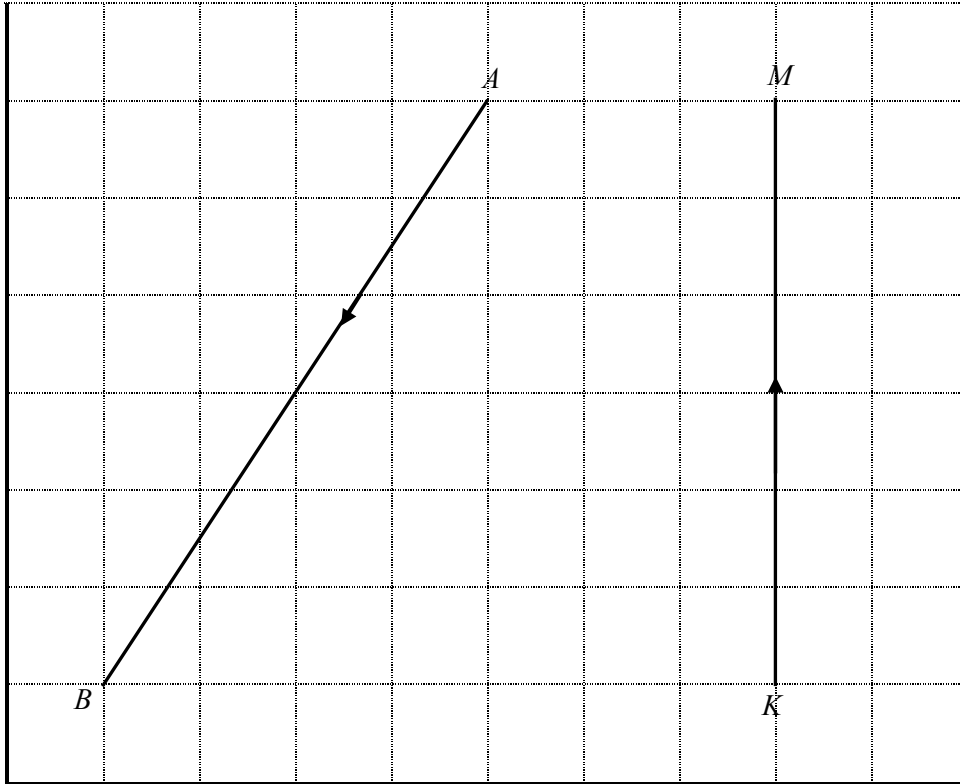
Answer (b) ..... [2]

- (c) Simplify

$$\frac{2x + 4}{x + 2}$$

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

- 16 The grid shows  $\overrightarrow{AB}$  and  $\overrightarrow{KM}$ .



Write down the column vector for,

(a)  $\overrightarrow{AB}$ ,

*Answer (a)*

[1]

(b)  $\overrightarrow{KM}$ .

*Answer (b)*

[1]

- 17 The data shows students' favourite topic in a mathematics class.

Favourite Topic	Number of students
Circle Geometry	5
Algebra	3
Trigonometry	8
Probability	4
Percentages	10

- (a) State the variable.

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

- (b) Write down the student's most favourite topic.

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

- (c) Find the total number of students in the class.

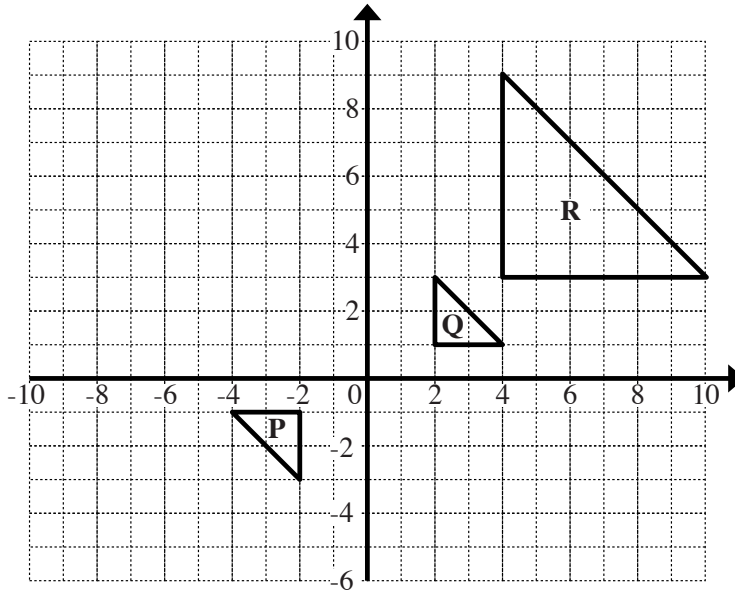
*Answer (c)* ..... [2]

- (d) Calculate the sector angle for the students whose favourite topic is circle geometry.

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

---

18 The triangles  $P$ ,  $Q$  and  $R$  are shown on the grid.



(a) Describe fully the **single** transformation which maps  $Q$  onto  $R$ .

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

(b) On the grid, draw the image of  $Q$  under a reflection in the line  $x = 0$ . [2]

(c) Describe fully the **single** transformation which maps  $Q$  onto  $P$ .

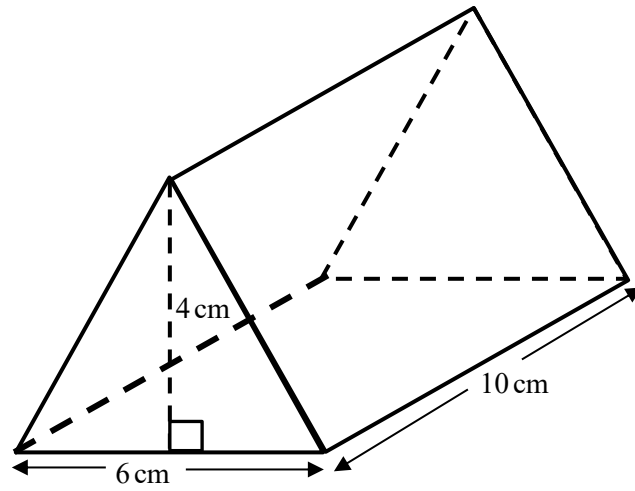
Answer (c) .....  
..... [3]

19 A school Principal buys 50 bags of rice for her learners' feeding scheme.  
In 2019 the school had 100 learners and the rice lasted them 25 weeks.  
In 2020 the school had 200 learners.

Calculate the number of weeks the 50 bags of rice lasted in 2020, assuming the learners eat at the same rate.

Answer ..... weeks [2]

20 The diagram below shows a prism.



NOT TO SCALE

(a) Write down the name of the prism.

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

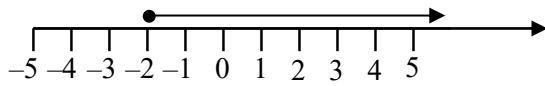
(b) Calculate the area of the triangular end.

Answer (b) .....cm<sup>2</sup> [2]

(c) Calculate the volume of the prism.

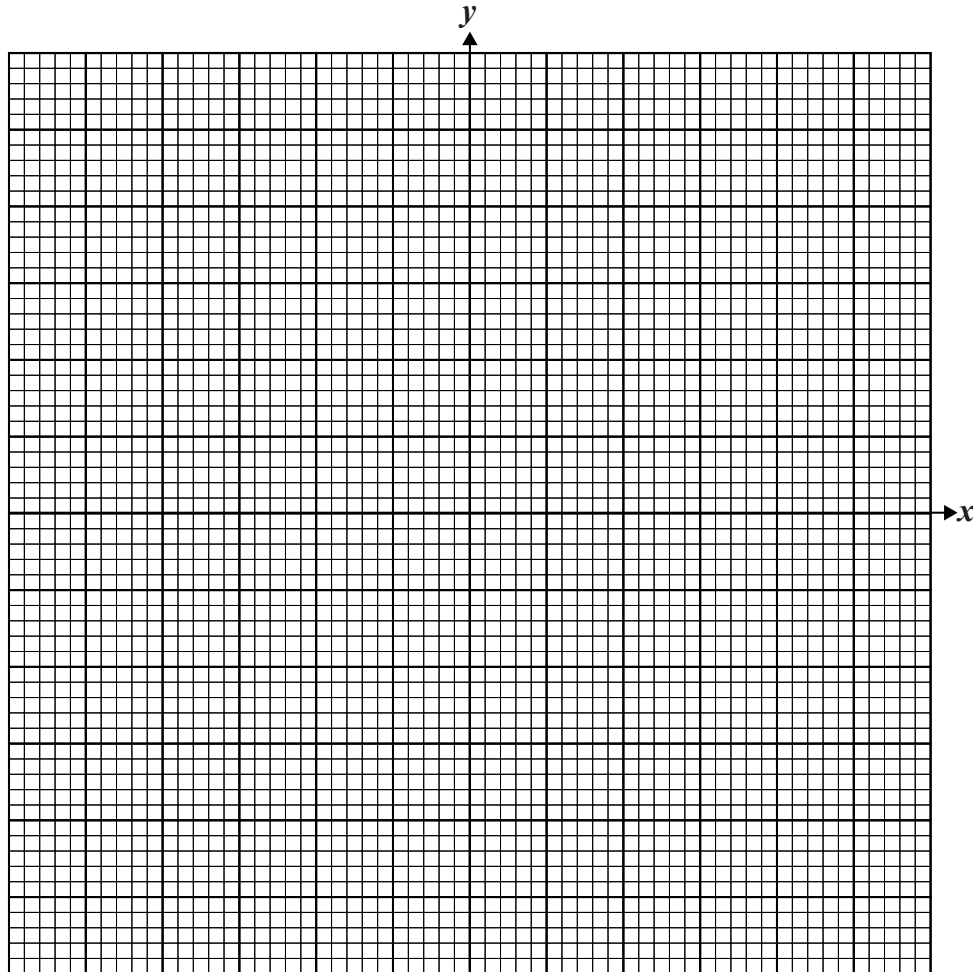
Answer (c) .....cm<sup>3</sup> [2]

- 21 (a) Write down the inequality shown on the number line.



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

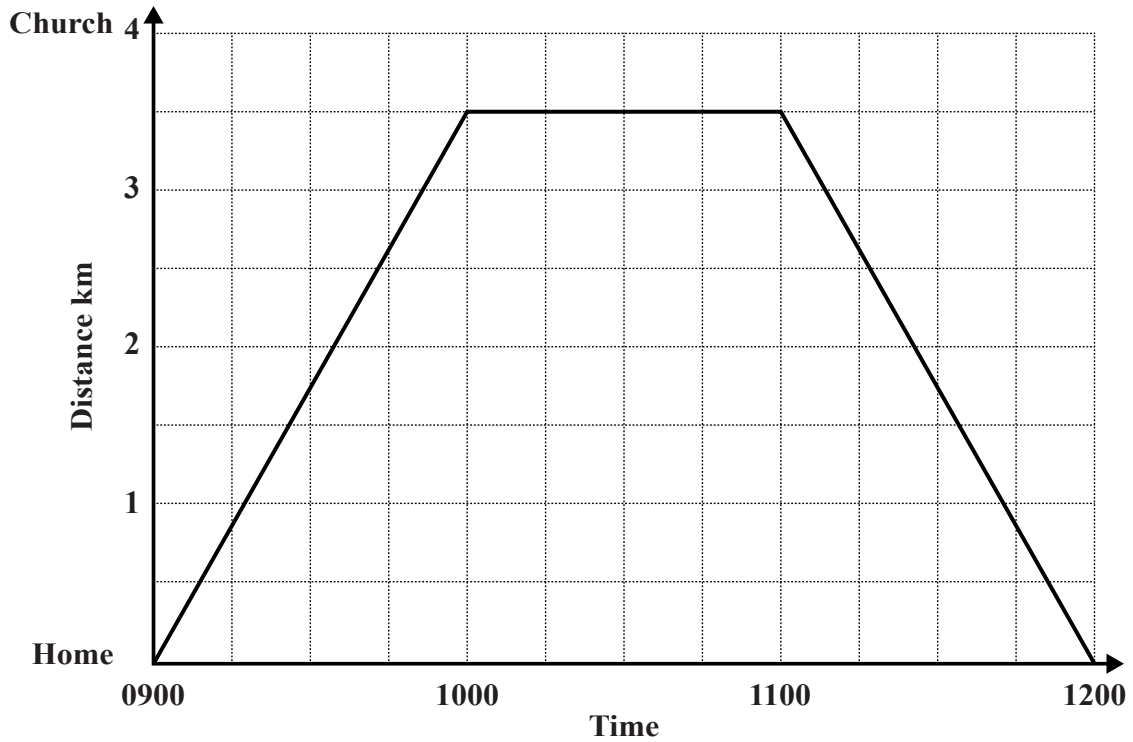
- (b) Represent the inequality  $y < 2x + 1$  on the grid



[3]



22 The graph shows Musa's journey from home to church on a Sunday.



(a) State how far the church is from Musa's home.

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

(b) State how long was Musa's journey from home to church, give your answer in hours and minutes.

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

(c) Explain what the graph represents after 1100 hours.

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

23 (a) Construct triangle  $UVW$  using a ruler, a protector and compasses.

$UV = 8\text{ cm}$ ,  $UW = 5\text{ cm}$  and  $VW = 9\text{ cm}$ .

•  
U

[3]

(b) On your diagram, construct the locus of points which are

(i) equidistant from  $U$  and  $V$ , [1]

(ii) equidistant from  $UV$  and  $UW$ . [1]

(iii) Mark and label with letter  $T$  the point of intersection of (i) and (ii). [2]



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