SUREKEY EXAMINATIONS BOARD

"Don't speak for Quality, Let Quality Speak for itself"

2024

MATHEMATICS MAGIC SERIES

OFFICIAL MARKING GUIDE

SECTION A: 40 MARKS

1. Workout: $444 + 66$.

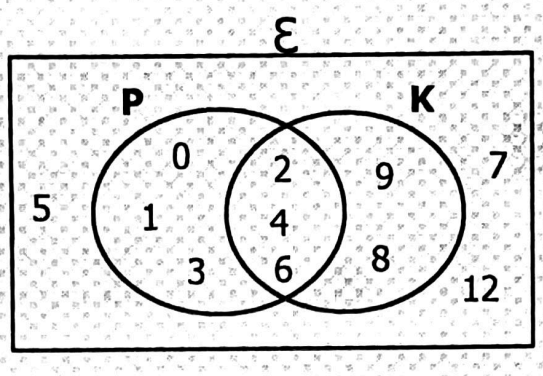
$$\begin{array}{r} {}^{1}444 \\ +\ 66 \\ \hline 510 \end{array}$$

2. Write 1001010 in words.

Millions	Thousands	Units
1	001	010

One million one thousand ten

3. Use the Venn diagram below to find n(P U K)'



(PUK)' = {5, 7, 12}

n(PUK)' = 3

4. Write the standard form of 34000.

$$\begin{array}{r} 3400.0 \\ 10 \\ \hline 340.0 \\ 10 \\ \hline 34.0 \\ 10 \\ \hline 3.4 \\ 10 \end{array}$$

In scientific form it is 3.4×10^4

5. If $x = 5$ and $4x + 2y = 38$, find the value of y.

$4x + 2y = 38$ But $x = 5$

$(4 \times 5) + 2y = 38$

$20 + 2y = 38$

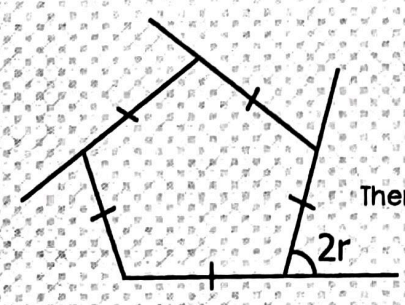
$20 - 20 + 2y = 38 - 20$

$2y = 18$

$\frac{{}^{1}2y}{2_1} = \frac{{}^{1}8}{2_1}$

$y = 9$

6. The diagram below shows a regular polygon. Find the value of r.



Ext< $= \frac{360^0}{5 \text{ sides}}$

$= 72^0$

Therefore $2r = 72^0$

$\frac{{}^{36}2r}{2_1} = \frac{72^0}{2_1}$

$r = 36^0$

OR:

$5\text{sides} \times 2r = 360^0$

$10r = 360^0$

$\frac{{}^{1}10r}{10_1} = \frac{360^0}{10_1}$

$r = 36^0$

7. If 5 books cost Sh.30,000, calculate how many more books can be bought with Sh.48,000 at the same rate.

5 books cost Sh.30,000

1 book costs Sh.$\frac{30{,}000}{5_1}$

= Sh.6,000

Sh.6,000 buys 1 book

Sh.48,000 will buy Sh.$\frac{48{,}000}{6{,}000_1}$ books

= 8 books

More books

8 – 5

3 more books

8. At a forex bureau, one pound sterling (£) is bought at Ugsh 4,450 and sold at Ugsh 4,400. How much in Uganda Shillings did a tourist with £164 get?

1£ will be bought at Ugsh.4,450

£164 will buy Ugsh.4,450 x 164

Ugsh.729,800

9. Find the range of; -2, 5, 0, -6 and 3.

Range = Highest - Lowest

= 5 – (-6)

= 5 + 6

= +11

10. A trader packed juice in 400ml bottles. How many bottles did he get from 6 litres of juice?

1000ml = 1litre

400ml = $\frac{400}{1000}$ litres

= $\frac{4}{10}$ litres

No. of bottles

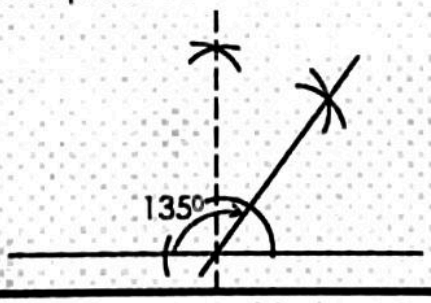
6 litres ÷ $\frac{4}{10}$ litres

$\frac{3}{6}$ litres x $\frac{10}{4}$ litres

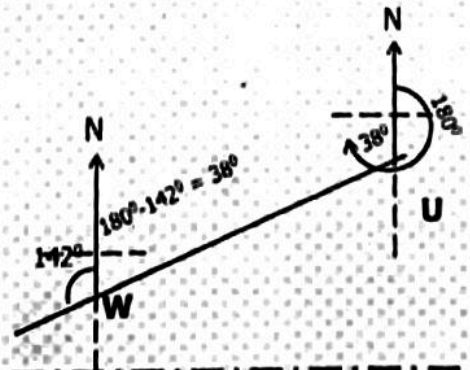
= 15 bottles

KHDLdcml

11. Using a pencil, a ruler and a pair of compasses only, construct an angle of 135^0 in the space provided below.



12. Use the figure below to find the bearing of point **W** from point **U**.



Bearing of W from U

180^0

+ 038^0

218^0

13. A taxi driver moving at a speed of 72km/h took 45 minutes on the way. Find the distance he covered.

$S = 72km/h$

$T = \frac{45}{60}h$

$D = S \times T$

$\frac{6}{72}\frac{km}{h} \times \frac{9}{\frac{45}{60}_{4}}h$

$6km \times 9$

$54km$

14. A school had 280 pupils last year. This year, the number decreased in the ratio of $\frac{3}{10} : \frac{2}{5}$. Find the new number of pupils in the school.

$\text{Decrease} = \frac{\text{New ratio}}{\text{old ratio}} \times \text{Quantity}$

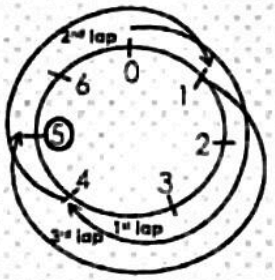
$(\frac{3}{10} \div \frac{2}{5}) \times 280$

$(\frac{3}{\cancel{10}_{2_1}} \times \frac{\overset{1}{\cancel{5}}}{\cancel{2}_1}) \times \overset{70}{\cancel{280}}$

3×70

$= 210 \text{ pupils}$

15. Workout 3 x 4 (finite 7) using a dial.



3 x 4 = 5 (finite 7)

16. Dennis borrowed Sh.160,000 from Barclays bank for 5 months at an interest rate of 6% per annum. How much interest will he pay?

$P = sh.160,000$

$R = 6\%$

$T = \frac{5}{12}$

$\text{Interest} = P \times R \times T$

$\text{Interest} = sh.\cancel{160}.000 \times \frac{6_1}{100} \times \frac{5}{\cancel{12}_{2_1}}$

$\text{Interest} = sh.800 \times 5$

$\text{Interest} = sh.4,000$

17. How many centimetres are in 0.84 metres? KHDMdcm

$1m = 100cm$

$0.84m = \frac{84}{\cancel{100}} \times \cancel{100}cm$

$= 84 \text{ centimetres}$

18. Arrange $\frac{2}{5}$, $\frac{2}{3}$ and $\frac{1}{2}$ in an increasing order.

$\frac{2}{\cancel{5}_1} \times \overset{6}{\cancel{30}} = 2 \times 6 = 12$

$\frac{2}{\cancel{3}_1} \times \overset{10}{\cancel{30}} = 2 \times 10 = 20$

$\frac{1}{\cancel{2}_1} \times \overset{15}{\cancel{30}} = 1 \times 15 = 15$

Increasing order

$\frac{2}{5}, \frac{1}{2}, \frac{2}{3}$

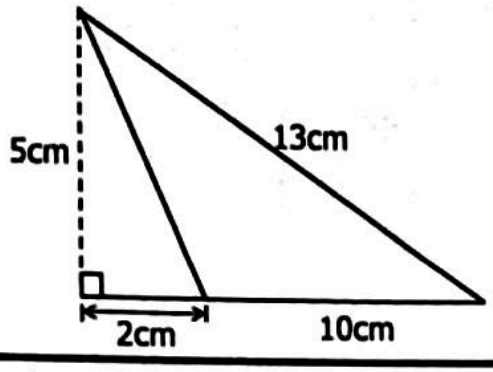
LCD

2	5	3	2
3	5	3	1
5	5	1	1
	1	1	1

$2 \times 3 \times 5$

$= 30$

19. Find the area of the figure below.



$A = \frac{1}{2} b \times h$

$A = \frac{1}{2}((2+10) \times 5)cm^2$

$A = \frac{1}{2_1}(\cancel{12} \times 5)cm^2$

$A = (6 \times 5)cm^2$

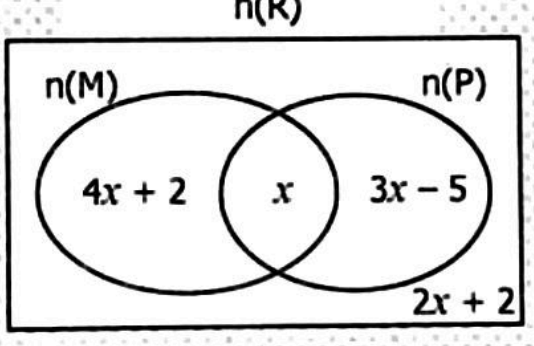
$A = 30cm^2$

20. The electricity transmission company planted twenty-one electricity poles in a straight line of distance 600metres. Find the gaps between the poles.

No. of gaps = No. of poles - 1
= 21 – 1
= 20 gaps

SECTION B: 60 MARKS

21. The Venn diagram below shows P.7 pupils who like Rice (R), Posho (P) and Matooke (M). All the pupils like Rice.



(a) If 14 pupils like only one type of food, find the value of x. (02 Marks)

$2x + 2 = 14$
$2x + 2-2 = 14-2$
$2x = 12$
$\frac{2x}{2_1} = \frac{\cancel{12}}{\cancel{2}_1}$
$x = 6$

(b) Find the total number of pupils in the class. (02 Marks)

$(4x + 2) + x + (3x – 5) + (2x + 2)$
$(4x6+2) + 6 + (3x6 – 5) + (2x6 + 2)$
$(24+2) + 6 + (18 – 5) + (12 + 2)$
$26 + 6 + 13 + 14$
$32 + 27$
59 pupils

22. There are 162 girls in Jeneford Primary School, 46% of the pupils are boys. During their sports day, each pupil was given 2 apples. How many apples were given to the whole school? (04 Marks)

%ge of girls	Total no.of pupils	No.of apples served
100% - 46% = 54%	$162 \div \frac{54}{100}$ $\overset{3}{\cancel{162}} \times \frac{100}{\cancel{54}_1}$ 3 x 100 = 300pupils	300 x 2 = 600apples

23. The median of 4 consecutive odd numbers is 30.

(a) Find the numbers. (03 Marks)

Let first number be m

1st No.	2nd No.	3rd No.	4th No.
m	m+2	m+4	m+6

median

$\frac{(m+2)+(m+4)}{2} = 30$

$\frac{m+m+2+4}{2} = 30$

$\overset{1}{\cancel{2}} \frac{(2m+6)}{\cancel{2}_1} = 30 \times 2$

$2m + 6 - 6 = 60 - 6$

$2m = 54$

$\overset{1}{\cancel{2}}m = \frac{\overset{27}{\cancel{54}}}{\cancel{2}_1}$

$m = 27$

1st No.	2nd No.	3rd No.	4th No.
m	m+2	m+4	m+6
27	27+2	27+4	27+6
27	**29**	**31**	**33**

(b) Workout the sum of the largest and smallest number. (01 Mark)

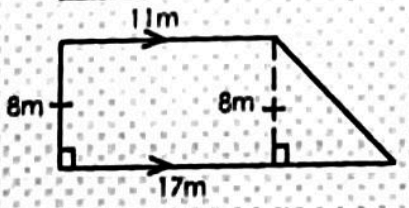
27 + 33

= 60

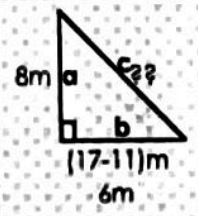
24. A right-angled trapezium plot of land measures 11 metres and 17 metres along its two parallel sides. If its height is 8 metres;

(a) Find the length of its fourth side. (02 Marks)

Sketch



Extracted triangle



Fourth length (c)

$c^2 = a^2 + b^2$
$c^2 = (8^2 + 6^2)m^2$
$c^2 = (8x8 + 6x6)m^2$
$c^2 = (64 + 36)m^2$
$c^2 = 100m^2$
$\sqrt[2]{c^2} = \sqrt[2]{100m^2}$
$c = 10m$ the fourth length is 10m

(b) Calculate;

(a) its perimeter. (02 Marks)

$P = S + S + S + S$
$P = (11 + 17 + 10 + 8)m$
$P = (28 + 18)m$
$P = 46m$

(b) its area. (02 Marks)

$A = \frac{h}{2}(a + b)$
$A = \frac{4}{2}(17 + 11)m^2$
$A = 4(28)m^2$
$A = 112m^2$

25. Given that $y = 2x + 2$, complete the table below. (04 Marks)

x	0	1	-2	-2	3
y	2	4	-2	-2	8

$y = 2x + 2$
$4 = 2x + 2$
$4 - 2 = 2x + 2 - 2$
$2 = 2x$
$\frac{2}{2} = \frac{2x}{2}$
$1 = x$
$x = 1$

$y = 2x + 2$
$y = (2 \times -2) + 2$
$y = -4 + 2$
$y = -2$

$y = 2x + 2$
$-2 = 2x + 2$
$-2 - 2 = 2x + 2 - 2$
$-4 = 2x$
$\frac{-4}{2} = \frac{2x}{2}$
$-2 = x$
$x = -2$

$y = 2x + 2$
$y = (2 \times 3) + 2$
$y = 6 + 2$
$y = 8$

26. Arinaitwe is twice as old as Kasigazi. In 5 years time, their total age will will be 79 years.

(a) How old is each now? (04 Marks)

Let Kasigazi's age be k

	Kasigazi	Arinaitwe
Now	k	2k
Future	k+5	2k+5

$k+5 + 2k+5 = 79$
$3k + 10 = 79$
$3k + 10 - 10 = 79 - 10$
$3k = 69$
$\frac{3k}{3} = \frac{69}{3}$
$k = 23$

Kasagazi now

(k)yrs
23 years

Arinaitwe now

(2k)yrs
2 x 23 years
46 years

(b) How old will Kasigazi be in 7 years time? (01 Mark)

Kasagazi in 7 years

23 + 7 years

30 years

27. The table below shows Halimah's shopping bill.

(a) Complete the table correctly. (04 Marks)

Item	Quantity	Unit Cost	Amount
Soap	4 bars	Sh.3,650per bar	Sh.14,600
Beans	3½kg	Sh...Sh.4,000.....	Sh.14,000
Sugar	750 .....grams	Sh.3,200 per kg	Sh.2,400
Rice	2kg	Sh.4,500per kg	Sh.Sh.9,000 .....
			Sh. ..Sh.40,000...

Beans

Sh.14,000 ÷ $\frac{7}{2}$

Sh.$\cancel{14}^{2}$,000 x $\frac{2}{\cancel{7}_{1}}$

Sh.2,000 x 2

= Sh.4,000

Sugar

1kg = 1000g.

$\frac{\cancel{3}^{3}}{\cancel{4}_{4}}$ x 1000g

$\frac{3}{4_{1}}$ x $\frac{\cancel{1000}^{250}}{1}$g

3 x 250g

= 750g

Rice

Sh.4,500

x 2

Sh.9,000

Total Expenditure

Sh.14,600
Sh.14,000
Sh. 9,000
+ Sh. 2,400
Sh.40,000

(b) Halimah paid Sh.38,000 for all the items. Calculate the percentage discount she was offered. (02 Marks)

%ge discount = $\frac{\text{discount}}{\text{Original price}} \times 100\%$

Discount

Sh.40,000
− Sh.38,000
Sh. 2,000

= $\frac{\text{Sh. 2,000}}{\text{Sh.40,000}} \times 100\%$

= 5%

28. (a) Add: 1 2 1three.
+ 2 2three
2 2 0 three

3 ÷ 3 = 1 rem 0

5 ÷ 3 = 1 rem 2

(02 Marks)

(b) Given that $101_t = 1101_{three}$, find the value of the base represented by letter t. (03 Marks)

$101_t = 1101_{three}$

t^2	t^1	t^0
1	0	1

3^3	3^2	3^1	3^0
1	1	0	1

$(1 \times t^2) + (0 \times t^1) + (1 \times t^0) = (1 \times 3^3) + (1 \times 3^2) + (0 \times 3^1) + (1 \times 3^0)$

$t^2 + 0 + 1 = 27 + 9 + 0 + 1$

$t^2 + 1 - 1 = 37 - 1$

$t^2 = 36$

$\sqrt[2]{t^2} = \sqrt[2]{36}$

$t = 6$ | t is base 6

29. Mr. Okello spends $\frac{1}{4}$ of his salary on fees, $33\frac{1}{3}$ % on transport, $\frac{1}{6}$ on food and saves Sh.360,000.

(a) Find Mr. Okello's monthly salary. (04 Marks)

METHOD I

Change all fractions to %ges

Fees → $\frac{1}{4}$ → $(\frac{1}{4_1} \times \frac{25}{100})\% = 25\%$

Transport → $33\frac{1}{3}\%$

Food → $\frac{1}{6}$ → $(\frac{1}{6_1} \times \frac{16\frac{2}{3}}{100})\% = 16\frac{2}{3}\%$

Savings Sh.360,000

Total %ge

$25\% + 33\frac{1}{3}\% + 16\frac{2}{3}\%$

$74 + (\frac{1}{3} + \frac{2}{3})$

$74 + (\frac{1+2}{3})$

$74 + 1 = 75\%$

%ge of savings

$100\% - 75\%$

$= 25\%$

Total Salary

Sh.360,000 ÷ $\frac{25}{100}$

Sh.360,000 x $\frac{4}{\cancel{25}_1}$

Sh.360,000 x 4

= Sh.1,440,000

METHOD II

Change the %ge to fraction

Fees → $\frac{1}{4}$. Food → $\frac{1}{6}$

Transport $(33\frac{1}{3}\%) = \frac{100}{3} \div \frac{100}{1}$

$= \frac{\cancel{100}}{3} \times \frac{1}{\cancel{100}}$

$= \frac{1}{3}$

Savings Sh.360,000

Fraction of savings

$\frac{1}{1} - (\frac{1}{4} + \frac{1}{3} + \frac{1}{6})$ LCD = 12

$\frac{1}{1} - (\frac{3+4+2}{12})$

$\frac{1}{1} - \frac{9}{12} = \frac{12-9}{12} = \frac{3^1}{\cancel{12}_4} = \frac{1}{4}$

Total Salary

Sh.360,000 ÷ $\frac{1}{4}$

Sh.360,000 x $\frac{4}{1}$

Sh.360,000 x 4

=Sh.1,440,000

(b) How much more money does he spend on fees than what he spends on food? (02 Marks)

Difference in fractions

$\frac{1}{4} - \frac{1}{6}$ LCD = 12

$\frac{3-2}{12}$

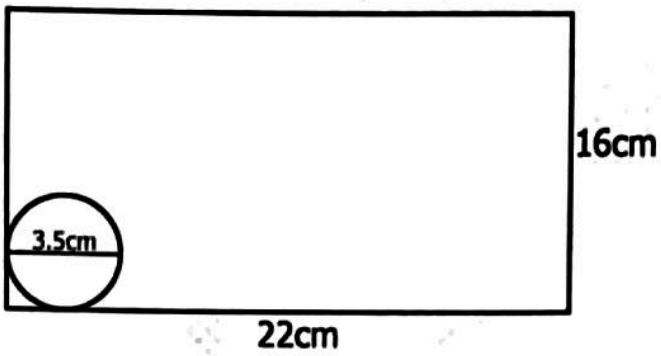
$= \frac{1}{12}$

More money

$\frac{1}{\cancel{12}_1}$ x sh.1440,000

Sh.120,000

30. The figure below shows a rectangular metallic sheet measuring 22cm by 16cm. Circular pieces of diameter 3.5cm are to be cut out from it. Study it carefully and answer the questions that follow.



(a) Find the total number of circular pieces that can be cut out of the rectangular sheet. (02 Marks)

Along the length

Length 22cm
diameter 3.5cm

22cm ÷ 35cm
10
22~~cm~~ x ~~10~~²
~~35~~ ~~cm~~
44⁴ rem 2
~~7~~₁
6 pieces

Along the width

width 16cm
diameter 3.5cm

16cm ÷ 35cm
10
16~~cm~~ x ~~10~~
~~35~~ ~~cm~~
32⁴ rem 4
~~7~~
4 pieces

No. of pieces cut out

6 x 4
24 pieces

(b) Calculate the area of the unused metallic sheet. (Use π as $\frac{22}{7}$)

Area of the metallic sheet

Length x Width
22cm x 16cm
352cm²

Area of unused sheet

352cm²
− 231cm²
121cm²

Diameter = 3.5cm

Radius = $\frac{35}{10} \div 2$
7

Radius = $\frac{\cancel{35}}{\cancel{10}_2} \times \frac{1}{2} = \frac{7}{4}$ cm

Radius = $\frac{7}{4}$ cm

Area of the circular pieces

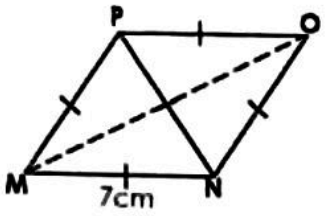
πr^2 x 24 pieces

$\frac{\overset{11}{\cancel{22}}}{\cancel{7}_1} \times \frac{\cancel{7}^1}{\cancel{4}_{2_1}}$cm x $\frac{7}{4_1}$cm x $\cancel{24}^6$cm

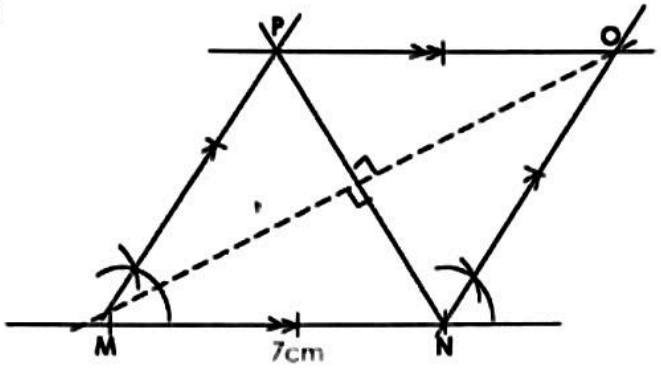
77cm x 3cm
231cm²

31. (a) Using a ruler, a pencil and a pair of compasses only, construct a rhombus **MNOP** where triangle **MNP** is an equilateral triangle of sides 7cm. (04 Marks)

Sketch



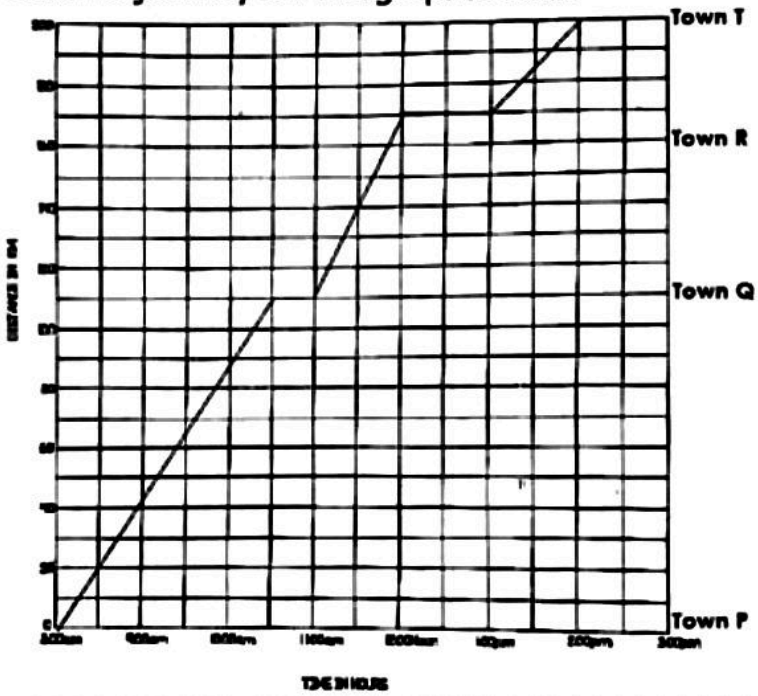
Accurate diagram



(b) Measure length MO. 12.1cm/12.2cm/12.3cm (01 Mark)

32. Julian left town P at 8:00a.m and drove at 55km per hour for 2 hours to town Q. she rested for a half an hour at town Q. She left town Q and drove for 1½ hours covering 60km to town R, she rested for another one hour and then drove for 60 minutes to town T at a distance of 30km.

(a) Draw Julian's journey on the graph below. (04 Marks)



Distance to Q

Speed x Time

$55\text{km} \times 2\text{h}$

$55\text{km} \times 2$

110km

(a) Calculate her average speed for the whole journey. (02 Marks)

Average speed = Total distance covered / Total time taken

$\frac{200\text{km}}{6\text{h}}$

$33\frac{2}{6}\frac{1}{3}$

$33\frac{1}{3}\text{km/h}$