NAME: ..... . **ADM NO:** . . . . **CLASS:**.....
.....

SCHOOL.....

MATHEMATICS

Instructions to students

a) Write your ***NAME***, ***ADMISSION NUMBER*** and ***CLASS*** in the spaces provided above.
b) This paper consists of ***TWO SECTIONS***: ***SECTION I*** and ***SECTION II.***
c) Answer ***ALL*** the questions in ***SECTION I*** and ***ONLY FIVE*** questions from ***SECTION II.***
d) All answers and working must be written on the question paper in the spaces provided below each question.
e) Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
f) Marks may be given for correct working even if the answer is wrong.
g) Non-programmable silent electronic calculators and KNEC Mathematical tables may be used except where stated otherwise.

For Examiner's use only

Section I (50mks)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total

Section II (50mks)

17	18	19	20	21	22	23	24	Total

Grand Total

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1. Evaluate without using a calculator . (3mks)

$$\frac{4of\,20+10\div5\times6}{6\times9-4\div2+12}$$

BODMAS

$= \frac{80+10\div5\times6}{6\times9-4\div2+12}$

$= \frac{80+2\times6}{6\times9-2+12}$ M_1

$= \frac{80+12}{54-2+12}$ M_1

$= \frac{92}{64}$

$= \frac{23}{16}$ A_1

2. Write down the following number in words . (1mk)

35,000,900,010

Thirty five billion, nine hundred thousand and ten. B_1

3. The GCD two numbers is 7 and their LCM I 140. If one of the numbers is 20, find the other number. (3mks)

GCD = 7

LCM = 140

The other number = $\frac{GCD \times LCM}{Given\ no.}$ M_1

Other number = $\frac{7\times140}{20}$ M_1

$= \frac{980}{20}$

$= 49$ A_1

4. a) Simplify the expression (3mks)

$$\frac{3x+4}{4}+\frac{x+1}{2}-\frac{2x+8}{3}$$

$= \frac{3(3x+4)+6(x+1)-4(2x+8)}{12}$ M_1

$= \frac{9x+12+6x+6-8x+8}{12}$ M_1

$= \frac{7x-14}{12}$

$= \frac{7x-14}{12}$ A_1 or $\frac{7(x-2)}{12}$

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b) solve for X in the equation below (2mks)

$2(x+4)=14$

$2x+8=14-8$ M1

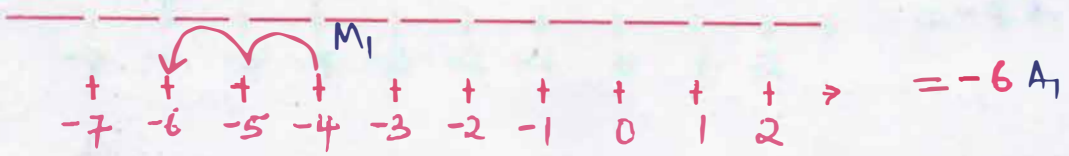
$2x=14-8$

$\frac{2x}{2}=\frac{6}{2}$

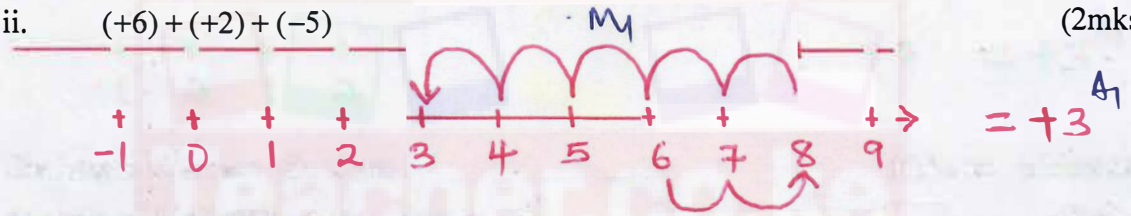
$X=3$ A1

5. use a number line to work out the following

i. $+(-4)+(-2)$ (2mks)



ii. $(+6)+(+2)+(-5)$ (2mks)



6. The length of an arc of a circle is 88cm. Find the radius of the circle if the arc substends an angle of 144° at the centre (take $\pi=\frac{22}{7}$. (3mks)

Length of an arc $=\frac{\theta}{360}2\pi r$

$88=\frac{144}{360}\times\frac{22}{7}\times2\times r$ M1

$88=\frac{88}{35}r$

$\times 88 \quad 88=\frac{88}{35}r\times\frac{35}{88}$ M1

$r=35\text{cm}$ A1

7. Ten men working six hours a day take 12 days to complete a job. How long willit take eight men working 12 hours a day to complete the same job? (3mks)

10 Men $\longrightarrow$ 6 hours $\longrightarrow$ 12 days

8 Men $\longrightarrow$ 12 hours $\longrightarrow$?

M1

$\text{Days}=\frac{10\times6\times12}{8\times12}$ M1

$\text{Days}=\frac{60}{8}$

$=7\frac{1}{2}$ days A1

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8. A shopkeeper made a loss of 20% by selling a trouser at sh 960. What profit would he have made if he sold it at sh 1500. (3mks)

$100\% - 20\% = 80\%$

$80\% = Ksh.\ 960$

$100\% \times M$

$\frac{100\% \times 960}{80\%}$

$= 1200$

$= Sh.\ 1500 - Sh.\ 1200$

$= Sh.\ 300$ M

Percentage Profit $= \frac{300}{1200} \times 100$

$= 25\%$ A

9. If a:b=2:3 and b:c 5:9, find the ratio a:c (2mks)

a : b : c

5(2 : 3)

3(5 : 9) M

a : b : c

10 : 15

15 : 27

a : c = 10 : 27 A

10. Express recurring decimal $0.7\dot{3}$ as a fraction. (3mks)

Let $r = 0.7\dot{3}$

$10r = 7.\dot{3}33$

$100r = 73.\dot{3}33$ M

$100r = 73.333$

$10r = 7.333$ M

$90r = 66$

$\frac{90r}{90} = \frac{66}{90}$

$r = \frac{66}{90}$

$r = \frac{11}{15}$ A

11. Three bells ring at interval ring of 40minutes 45 minutes and 60 minutes. If they ring simultaneously at 6.30am, at what time will they ring next together?. (3mks)

L.C.M

2	40	45	60
2	20	45	30
2	10	45	15
3	5	45	15
3	5	15	5
5	5	5	5
	1	1	1

M

$= 2 \times 2 \times 2 \times 3 \times 3 \times 5$

$= \frac{360 \text{ minutes}}{60 \text{ minutes}} \times 1 \text{ hour}$ M $= 6 \text{ hours}$

$= 6:30$

6.00

12.30 $= 12.30$ p.M A

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12. The size of an interior angle of a regular polygon is $3x°$ while its exterior angle is $(x - 20)°$

Find the value of x. (2mks)

$3x° + (x-20)° = 180°$ M

$3x° + x° - 20° = 180°$

$4x° = 180° + 20°$

$\frac{4x°}{4} = \frac{200}{4}$

$x = 50°$ A1.

b) the sum of interior angles of a regular is 1440°. Find the number of sides of the polygon hence name the polygon. (3mks)

$(2n-4)90° = 1440°$ M

$180n - 360° = 1440°$

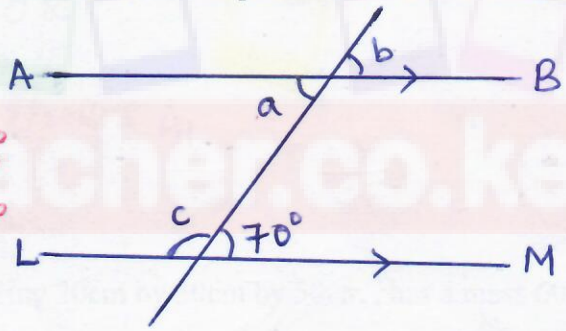
$180n = 1440° + 360°$

$\frac{180n}{180} = \frac{1800}{180}$ 10

$n = 10$ sides A1

Hence the polygon is Decagon B1.

13. In the figure below, lines AB and LM are parallel. Find the values of the angle marked a, b and c. (3mks)



$c = a$ (alternate angles on parallel lines) $a = 70°$

$c + 70 = 180° - 70° = 110°$

$c = 110°$, $a = 70°$ B1

$a = b$ (Directly opposite angles). $b = 70°$ B1

$a = 70°$

$b = 70°$

$c = 110°$

14. Simplify (3mks)

$$\frac{ax - ay + bx - by}{a + b}$$

$= \frac{a(x-y) + b(x-y)}{a+b}$ M

$= \frac{(a+b)(x-y)}{a+b}$ M

$= x - y$ A1

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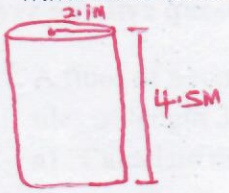
15. a) A school water tank has a radius of 2.1 m and a height of 4.5m. how many litres of water does it carry when full. (3mks)



Volume $= \pi r^2 h$

$= \frac{22}{7} \times 2.1 \times 2.1 \times 4.5$

$= 62.37 M^3$ M1

$1M^3 = 1000$ Litres

$= 62.37 m^3 \times$

$= \frac{62.37 M^3 \times 1000 \text{ Litres}}{1 M^3}$ M1

$= 62370$ Litres A1

b) If the school uses 5000 litres of water a day approximately, how many days will the filled tank last. (3mks)

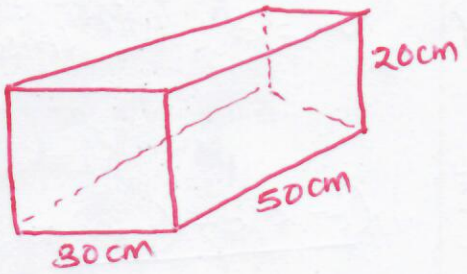
1 Day $=$ 5000 Litres

$\times$ 62370 Litres M1

$= \frac{1 \text{ Day} \times 62370 L}{5000 L}$ M1

$= 12$ days 11 hours A1

16. A wooden block measuring 20cm by 30cm by 50cm , has a mass 60kg. find the density of this wood in g/cm^3. (3mks)



Volume $= 20cm \times 30cm \times 50cm$

$= 30000 cm^3$ M1

Mass $= 60kg$

$= 1kg = 1000g$

$60kg \times$

$= \frac{60kg \times 1000g}{1kg}$ M1

$= 60,000g$

Density $= \frac{\text{Mass}}{\text{Volume}}$

$= \frac{60,000g}{30,000 cm^3}$

Density $= 2g/cm^3$ A1

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SECTION B

Answer any five questions only. (50marks)

17. A floor of a room is in the shape of a rectangle 3000cm long by 300cm wide. Square tiles of length 30cm are to be filtered onto the flow

a) Calculate the number of tiles needed for the floor. (4mks)

No. of tiles $= \frac{3000\,cm \times 300\,cm}{30\,cm \times 300\,cm}$ M1

$= \frac{900,000\,cm^2}{900\,cm^2}$ M1

$= 1000$ Tiles A1

b) A dealer wishes to buy enough tiles for fifteen such rooms . the tiles are packed in cartons . each carton containing 20 tiles. The cost of each carton is ksh 800. Calculate;

i. The cost of the tiles for the fifteen such rooms. (5mks)

1 carton = 20 tiles

X 1000 tiles M1

$= \frac{1\,carton \times 1000\,tiles}{20\,tiles}$

$= 50$ cartons. A1

1 carton = sh. 800

50 carton X M1

$\frac{50\,carton \times 800\,sh}{1\,carton}$

$=$ sh. 40,000

1 room = sh. 40,000 M1

15 rooms X

$= \frac{15\,rooms \times sh.\,40,000}{1\,room}$

$=$ Ksh. 600,000 A1.

ii. If in addition the dealer spends kshs 2,600 on transport. Calculate the total cost (1mk)

Total cost = Cost of tiles + Transport cost

= Ksh. 600,000 + Ksh. 2600 B1

= Ksh. 602,600

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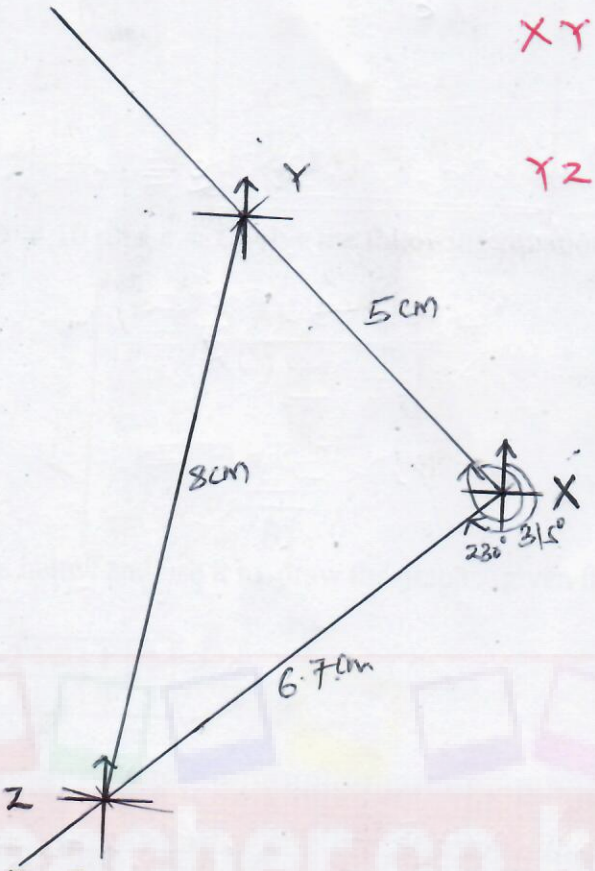
18. Three towns X,Y, and Z are such that Y is 500km on a bearing of 315° from X. Z is on a bearing of 230 from X. given that the direction between Y and Z is 800km.

a) Using a scale of 1cm represent 100km, draw a scale diagram to show the position of the towns. (6mks)

XY = 1cm rep 100KM
? 500Km B1
= 5CM

YZ = 1cm rep 100KM
? 800Km B1
= 8CM



S - 1
B1 - Locate Y
B1 - Locate Z
B1 - complete diagram

b) Find th bearing of ;

i. X from Z. (1mk)

050° ± 1 B1

ii. Z from Y (1mk)

190° ± 1 B1

c) Use the scale drawing to find the distance from X to Z. (2mks)

XZ = 6.7 ± 1 cm
1cm rep 100KM
6.7cm B1 ?

XZ = 670KM B1

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19. (a) Solve the following simultaneous equation suing elimination method. (3mks)

$3x + 2y = 12$

$x + y = 5$

$(3x + 2y = 12)\ 1$ M1

$(x + y = 5)\ 2$ M1

$3x + 2y = 12$

$2x + 2y = 10$

$3x + 2y = 12$

$2x + 2y = 10$ −

$x = 2$ A1

$x + y = 5$

$2 + y = 5$

$y = 3$ A1

$2 + y = 5$ −2

(b) Given that $a = 5, b = 10$ *and* $c = 6$ solve the following equation. (3mks)

$$\frac{2a^2 - b}{3c}$$

$$= \frac{2(5^2) - 10}{3 \times 6}$$ M1

$$= \frac{(2 \times 25) - 10}{18}$$ M1

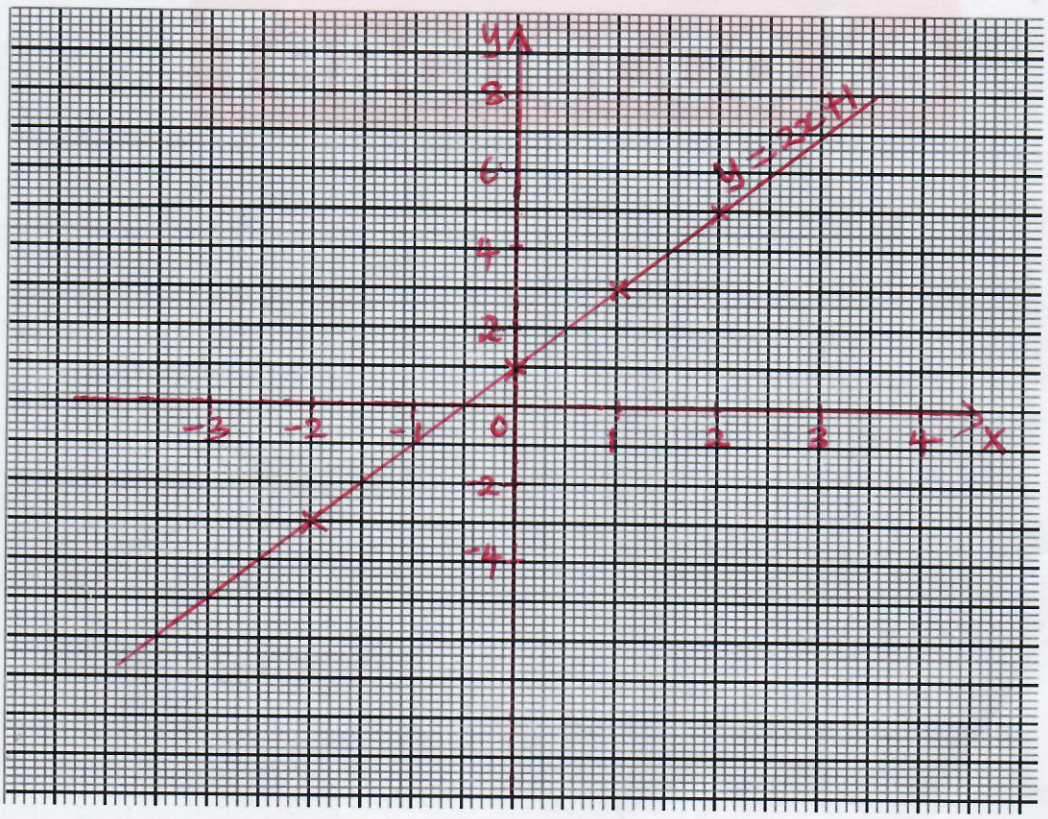
$$= \frac{50 - 10}{18} = \frac{40}{18}\ 9\ 20$$

$$= 20/9$$ A1

(c) Complete this table below and use it to draw the graph . given that $y = 2x + 1$ (5mks)

X	-2	0	1	2
Y	-3	1	3	5

B_2



S-1

P-1

L-1

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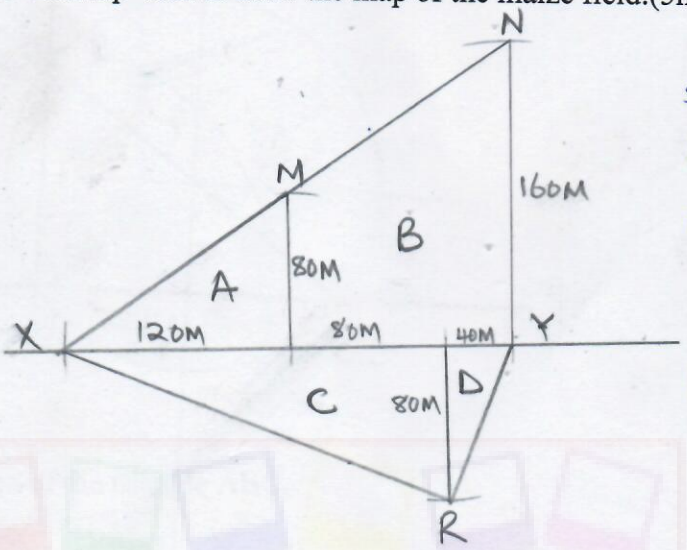
20. Measurements of a maize field using a base line XY were recorded as shown below. (measurements are in metres)

	Y	
	240	160 to N
To R 80	200	
	120	80 to M
	X	

a) Using a scale of 1cm rep 40m to draw the map of the maize field.(5mks)



S - 1
B_1 - Locate M
B_1 - Locate N
B_1 - Locate R
B_1 - Correct/complete diagram

b) Find the area of the field in hectares. (5mks)

$A = \frac{1}{2} \times 120 \times 80 = 4800M^2$

$B = \frac{1}{2} \times (80+160) \times 120$ M1

$= 14400M^2$

$C = \frac{1}{2} \times 200 \times 80 = 8000M^2$ M1

$D = \frac{1}{2} \times 80 \times 40 = 1600M^2$

Total area $= (4800 + 14400 + 8000 + 1600)M^2$

$= 28,800M^2$ M1

$= 1ha = 10000M^2$

$? \times 28,800M^2$ M1

$= \frac{1ha \times 28,800M^2}{10,000M^2}$

$= 2.88ha$ A1

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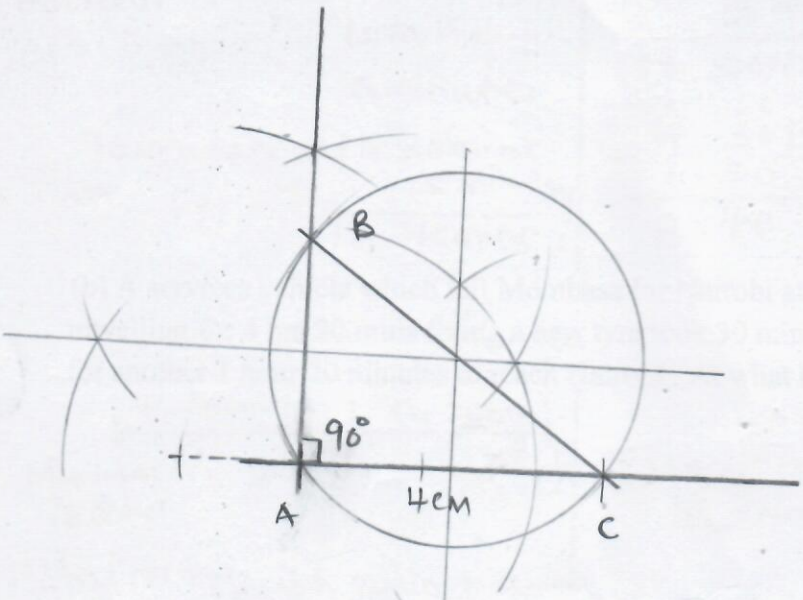
21. (a) Using a ruler and a pair of compass only. Construct a triangle ABC in which angle BAC=90°, AC =4cm and BC=5cm and draw a circle to pass through points A,B,C.(5mks)



B_1 - construct 90°

B_1 - Line BC & AC

b_1 - Bisect any two sides

B_1 - Identify the centre.

B_1 - circle

(b) Find the area of the triangle ABC. (2mks)

AB = 3 cm

Area of triangle ABC = $\frac{1}{2}bh$ M1

$= \frac{1}{2} \times 4^2 \times 3$

$= 6.0\ cm^2$ A_1

(c) Measure the radius of the circle passing through points A,B and C and use it to find its area. (3mks)

Radius of the circle = 2.5cm ±0.1 B_1

Area = πr^2

$= \frac{22}{7} \times 2.5 \times 2.5$ M1

$= 19.64\ cm^2$ A_1

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22. A) A football match lasts 90 minutes with a break of 15 minutes at half-time. If a referee allows five minutes extra for injuries and stoppage , what time did the match kicked off it it ends at 4.30 pm. (3mks)

Football match = 90mins + 15mins + 5minutes

90minutes = 1h 30mins + 15mins M1

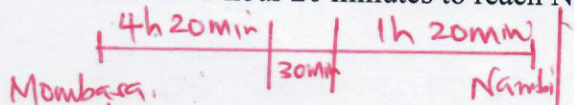
1h 45mins

1h 45mins
5 mins
1h 50mins

$\overset{3}{\cancel{4}}\,\overset{6}{\cancel{0}}$ · 30 p.m M1
− 1 50
2 · 40

= 2 · 40 p.m A1

(b) A services vehicle which left Mombasa for Nairobi at 1800hrs has a puncture after travelling for 4 hrs 20 mins fixing a new tyre took 30 minutes . the vehicle then travelled for another 1 hour 20 minutes to reach Nairobi . At what time did it arrive. (4mks)



Total time taken = 4h 20min + 30min + 1h 20mins M1
= 6h 10mins

Time arrived at Nairobi = 1800hrs + 6h 10mins M1
= 0010hrs or 12.10pm A1

(c) the table below is a matatu timetable for journeys between towns A and D via towns B and C.

time	arrival	departure
A		0930h
B	1045h	1055h
C	1230h	1245h
D	1400h	

Use the table to answer the following questions

a) What time does the matatu depart from B?. (1mk)

1055h B1

b) How long does it take the matatu to travel from towns A to town D? (2mks)

1400h − 0930h M1 = 4h 30minutes A1

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23. During a certain month the exchange rates in a bank were as follows;

	Buying (Ksh	Selling (Ksh)
1 US dollars	91.65	91.80
1 Euro	103.75	103.93

A tourist left Kenya to the United State with Ksh 1,000,000. On the airport he exchanged all the money to US dollars and spent 190 dollars on air ticket. While in US he spend 4500 dollars for upkeep and proceeded to Europe while in Europe he spent a total of 2000 Euros.

a) How many US dollars he had before spending on air ticket. (2mks)

1 US dollars = 91.80 Keh
X 1000,000 Keh M1

= 1 US$ × 1000,000 Keh / 91.80 Keh.

= US dollars 10893.25 A1

b) Calculate amount of money he had before proceeding to Europe in Kenya shillings to the nearest shillings. (4mks)

Air ticket = 10,893.24 − 190
= 10703.25 M1
In USA = 10703.25 − 4500 M1
= US$ 6203.25 M1

Converting to Keh.
1 US$ = Ksh. 91.65
US$ 6302.25 X M1

US$ 6302.25 × 91.65 Keh / 1 US$

= Ksh. 568,528 A1

c) How many money in Euro's did he remain at the end of the journey. (4mks)

1 Euro = Keh. 103.93
X Keh. 568528 M1

= 1 Euro × Keh. 568528 / Keh. 103.93 M1

= 5470.30 EUROS

Expenditure in Europe = 2000 E
= 5470.30 − 2000 M1
= 3470.30 EUROS A1

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24. Munyua spent ¼ of his net January salary on school fees. He spent ¼ of the remainder of electricity and water bills. He spent $^1/_9$ of wha remained on transport. If he finally has sh 3400, calculate ;

a) His net January salary. (5mks)

Fees → 1/4

Water & Electricity = 3/4 of 1/4 = 3/16 M

3/16 + 1/4 = (3+4)/16 = 7/16

Transport = 9/16 × 1/9 M

= 1/16

1/16 + 3/16 + 1/4 = (1+3+4)/16

= 8/16 M

16/16 − 8/16 = 8/16

= 1/2 M

1/2 → Ksh. 3400

1 → X

1 × 3400 × 2/1

= Ksh. 6,800 A1

b) Money spent on school fees. (1mk)

school fees = 1/4 × 6,800 = Ksh. 1700 A1

c) Money spent on transport . (2mks)

Transport = 1/16 × 6800 = Ksh. 425 A1

d) Money spent on electricity and water bills. (2mks)

Water & Electricity = 3/16 M

3/16 × 6,800 = Ksh. 1275 A1

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