456/1
MATHEMATICS
Paper 1
2024

UGANDA NATIONAL EXAMINATIONS BOARD

Uganda Certificate of Education

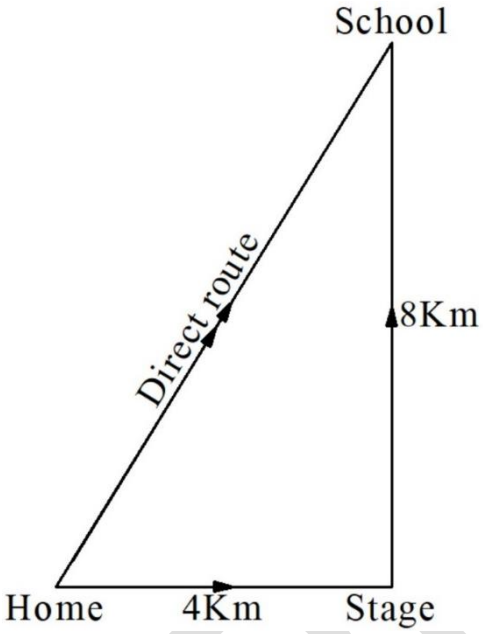
MATHEMATICS

Paper 1

New Lower Secondary Curriculum

SCORING GUIDE

1(a) Distance from home to school using the direct route.



(Direct distance)$^2 = 4^2+8^2$

Direct distance $= \sqrt{(4^2+8^2)}$

$=\sqrt{(16+64)}$

$=\sqrt{(80)}$

$=8.94$km

(b)(i) school fees $= \frac{100-60}{100} \times 900{,}000/=$

$= \frac{40}{100} \times 900{,}000/=$

$= 360{,}000/=$

Uniform $= 350{,}000 - 87{,}500$

$= 262{,}500/=$

Total amount to be paid $= 360{,}000 + 262{,}500$

$= 622{,}500/=$

(b)(ii) Conclusion: yes, the guardian will afford the school since the total amount to be paid is less than the 700,000/= s/he has budgeted for school expenses.

(c)(i) Payment plan 1

First instalment = $\frac{2}{3} \times 900{,}000/=$

= 600,000/=

Second instalment =900,000 – 600,000

= 300,000/=

Payment plan 2

Each instalment =$\frac{1}{3} \times 900{,}000/=$

=300,000/=

(c)(ii) Recommended payment plan:

Reason:

2. Let x be the number of cows to be sold and y the number of goats to be sold.

$x \geq 0, y \geq 0$

$x \leq 10$

$y \geq 8$

$x + y \leq 20$

$y < 2x$

Sales =1,500,000x + 200,000y

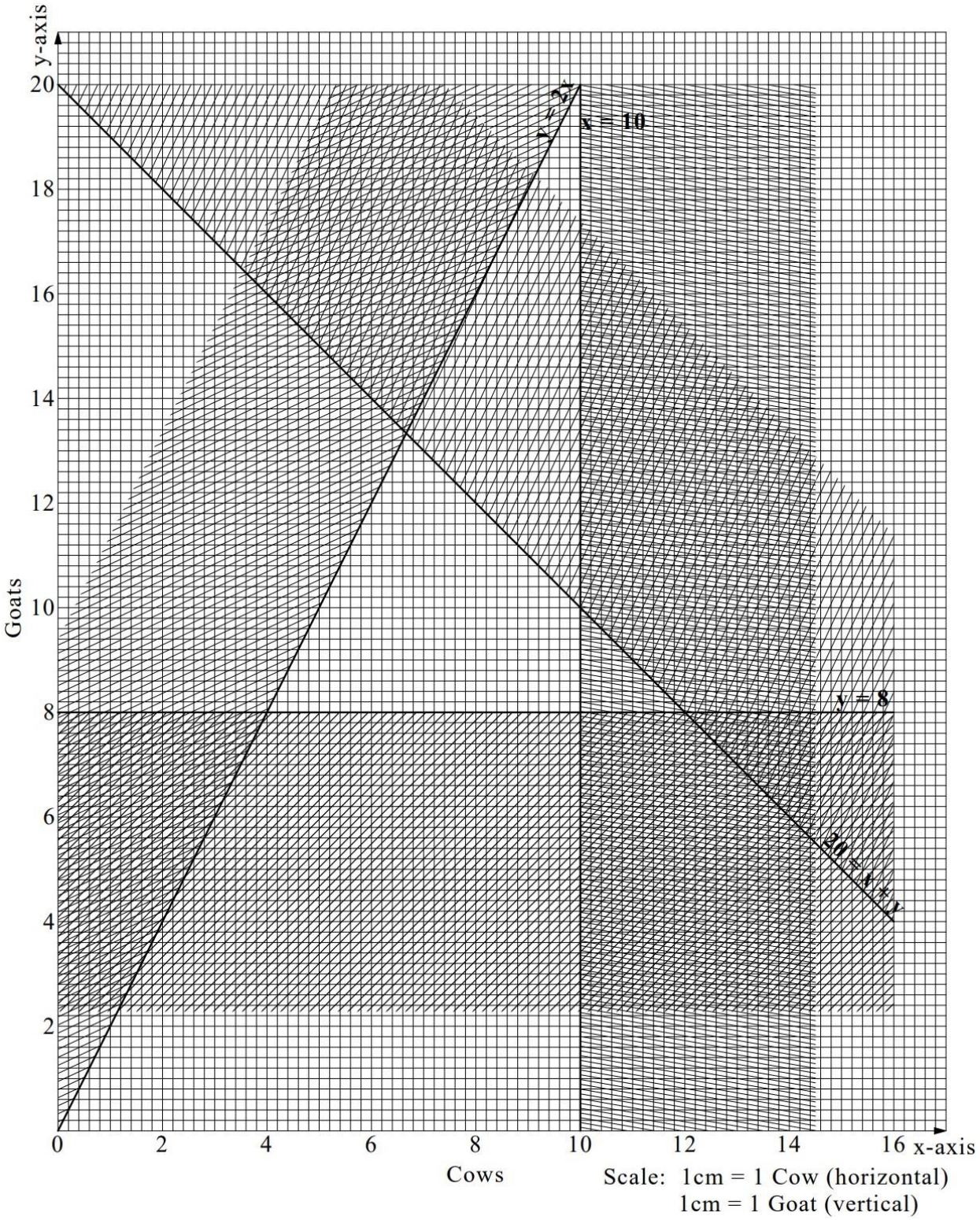
For y = 2x

x	0	1
y	0	2

For x + y = 20

x	0	20
y	20	0

A graph showing the feasible region



Maximisation of sales

Optimal points (x,y)	Sales =1,500,000x + 200,000y
(10,10)	17,000,000
(9,11)	15,700,000
(8,12)	14,000,000
(7,13)	13,100,000

(any other point(s) within the feasible region)

Conclusion: Chooses a combination that maximises sales (a combination that gives the highest amount of money).

That is,they should sell ten cows and ten goats to maximise sales and they will make 17,000,000/=.

OR

Accept any other correct method.

Qtn3.

Time(Min)	Tallies	Freq (f)	Cumm freq	Class boundary	Mid-point (x)	fx
15-19	///	3	3	14.5-19.5	17	51
20-24	////	4	7	19.5-24.5	22	88
25-29	~~////~~ ~~////~~	10	17	24.5-29.5	27	270
30-34	~~////~~ ~~////~~	11	28	29.5-34.5	32	352
35-39	~~////~~ ////	9	37	34.5-39.5	37	333
40-44	~~////~~ /	6	43	39.5-44.5	42	252
45-49	~~////~~ //	7	50	44.5-49.5	47	329
50-54	~~////~~	5	55	49.5-54.5	52	260
55-59	~~////~~	5	60	54.5-59.5	57	285
		∑f=60				**∑fx=2220**

(a) Mean time = $\frac{\sum fx}{\sum f} = \frac{2220}{60}$ = 37 minutes

The assemble start time should be 37 minutes from 7:30AM since the average time of arrival of the students after 7:30 AM is 37 minutes. That is, the assembly should start at 8:07 AM.

Note: Accept calculation of any measure of central tendency followed by a relevant/appropriate explanation.

(b) EITHER

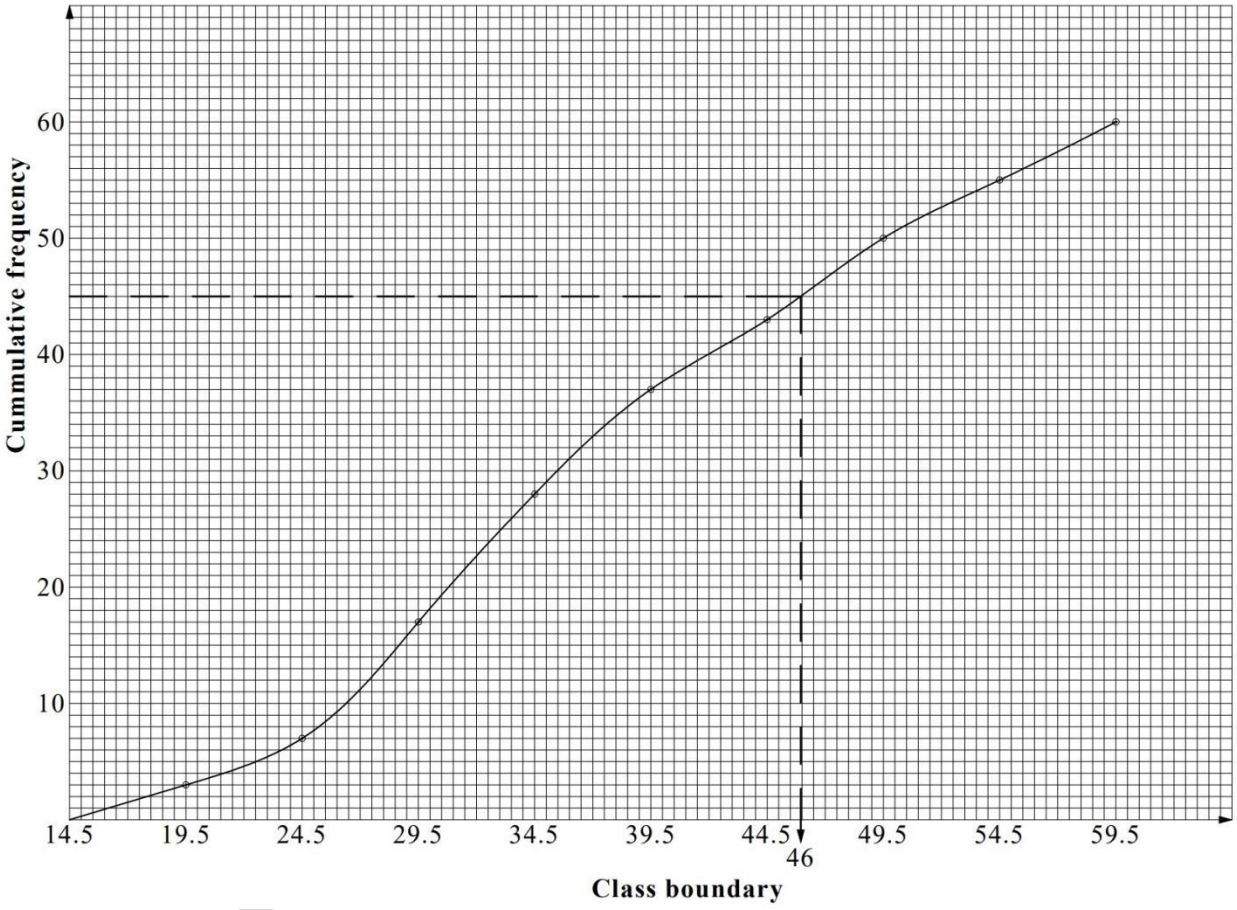
75% = 75th percentile, given by ($\frac{75}{100}$ x N)th position of cumulative frequency.

= ($\frac{75}{100}$ x 60)th position of cumulative frequency

= 45th position of cumulative frequency

From the Ogive, 75th percentile = 46 minutes. (see Ogive)

The assemble start time should be 46 minutes from 7:30AM since the arrival time of 75% of the students after 7:30AM is 46 minutes. That is, the assembly should start at 8:16AM.



OR

Note: Accept calculation of the 75th percentile using a formula.

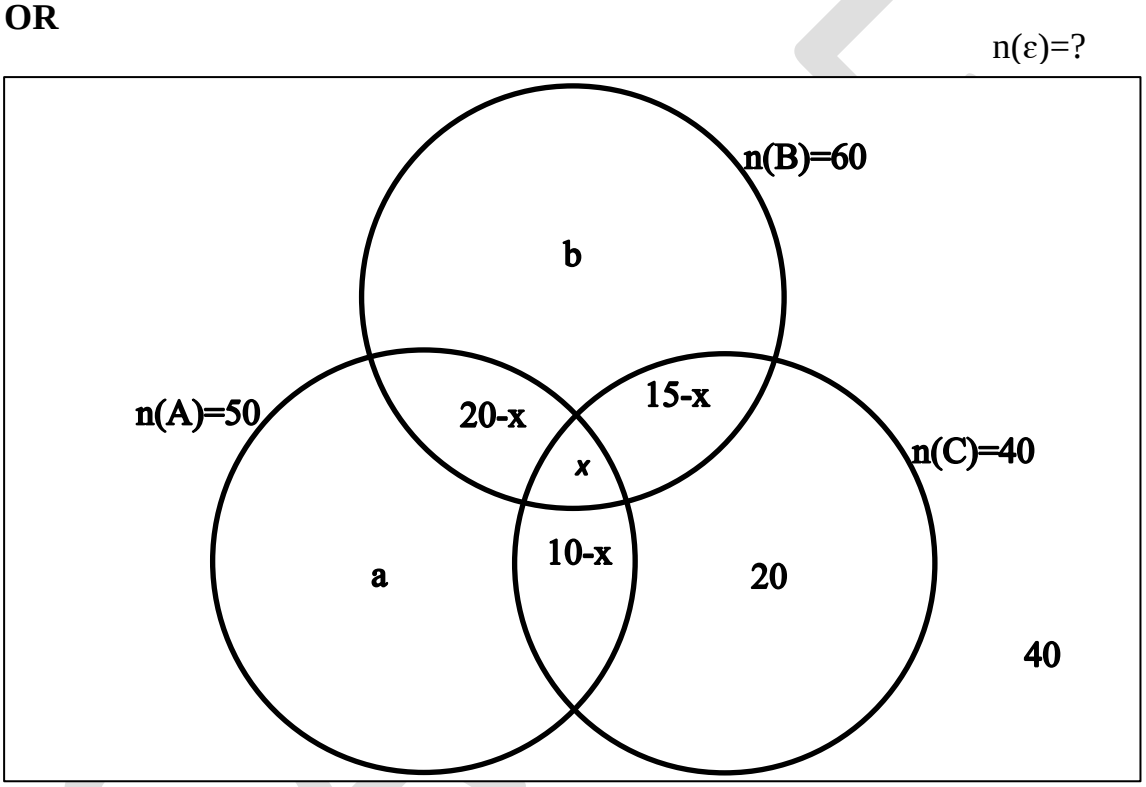
Question 4

SOLUTION

EITHER

$n(\varepsilon)=?$, $n(A)=50$, $n(B)=60$, $n(C)=40$, $n(A\cap B)=20$, $n(A\cap C)=10$, $n(B\cap C)=15$, $n(C)_{only}=20$, $n(A\cap B\cap C)=x$, $n(A\cap B)_{only}=20-x$, $n(A\cap C)_{only}=10-x$, $n(B\cap C)_{only}=15-x$, $n(A)_{only}=?$, $n(B)_{only}=?$, $n(AUBUC)'=40$.

OR



Using the people who visited district C and tested positive gives;

$x + 15- x + 10- x + 20 = 40$

$45- x = 40$

$x = 5$

Therefore, 5 people who had visited all the three districts tested positive for malaria.

The number of people who visited district A only and tested positive is given by;

$50- (x + 20- x + 10- x) = 50- 30 + x = 20+5 =25$

The number of people who visited district B only and tested positive is given by;
$60- (x + 20- x + 15- x) = 60- 35 + x = 25+5 =30$

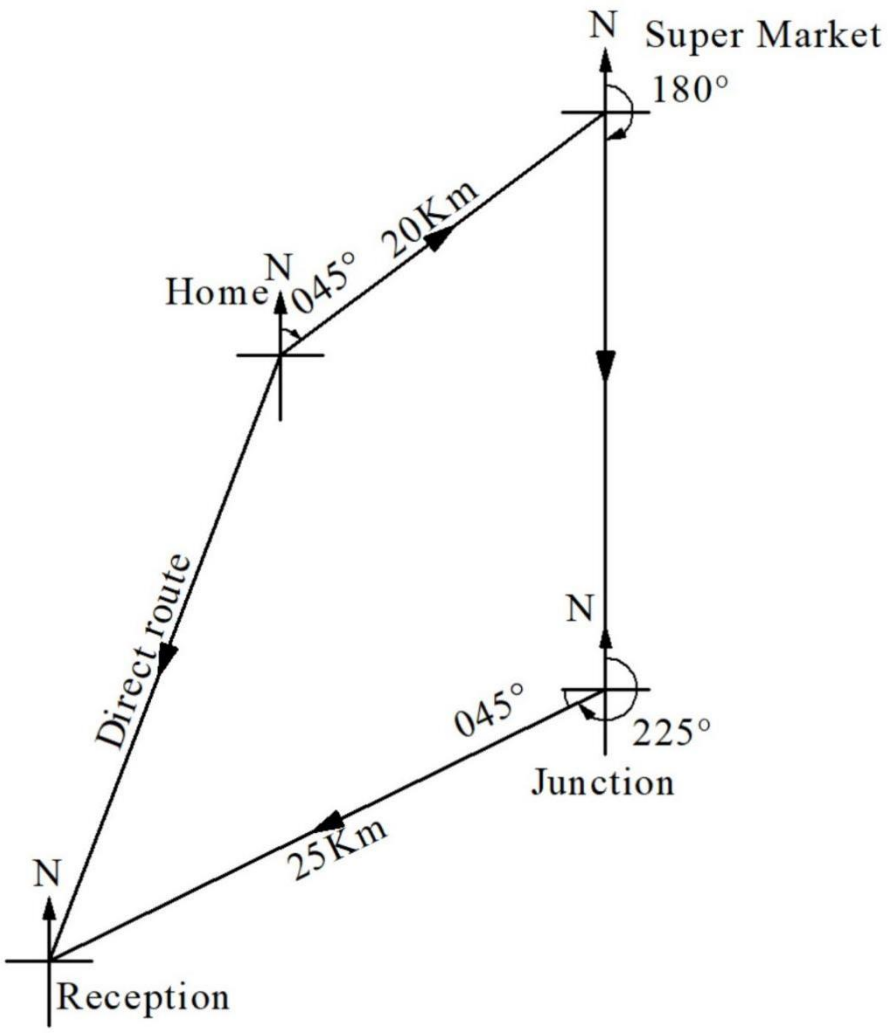
The number of people who visited at least one district and tested positive is given by;
60+ 25+ (10-*x*) + 20 = 115- *x* = 115-5 =110

The sample that was purposively selected n(ε) = 110 + 40 = 150

Therefore the chance of testing positive for malaria having visited at least one district is given by; P(positive having visited at least one district)= $\frac{110}{150}$ =0.733=73.3%

The ministry should come up with interventions since the chance of testing positive having visited at least one district is high (73.3%).

5. Sketch drawing



Distance (D) from super market to junction?

Speed = 50km/h

Time = 45minutes

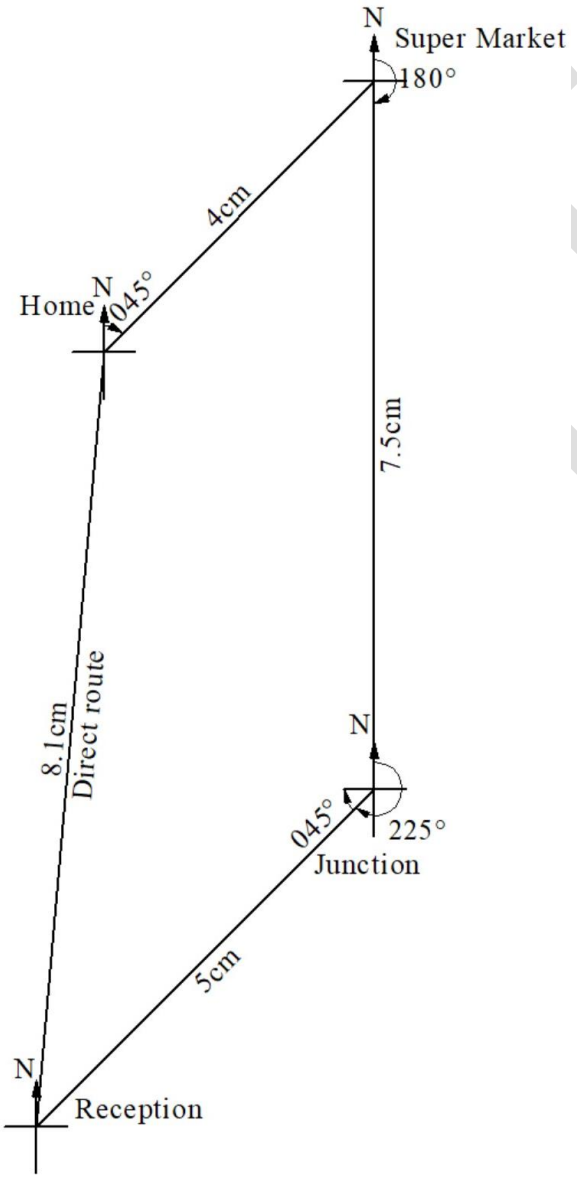
= $\frac{45}{60}$ hours **or** Time= $\frac{3}{4}$ hours **or** Time= 0.75hours

D = Speed × Time

D = 50 × 0.75

D = 37.5km

Accurate drawing



(a)(i) State the bearing of the Home from the Reception.

(a)(ii)Direct route distance= 8.1 cm

= (8.1×5) km

= 40.5 km

(ii) Distance = 40.5 km

Speed = 50 km/h

Time = $\frac{Distance}{Speed}$

Time = $\frac{40.5}{50}$

Time = 0.81hours

Time = (0.81×60) minutes

Time = 48.6 minutes

Time ≈ 49minutes

We will leave home 49 minutes to 2:00 PM to reach the party venue on time.

OR

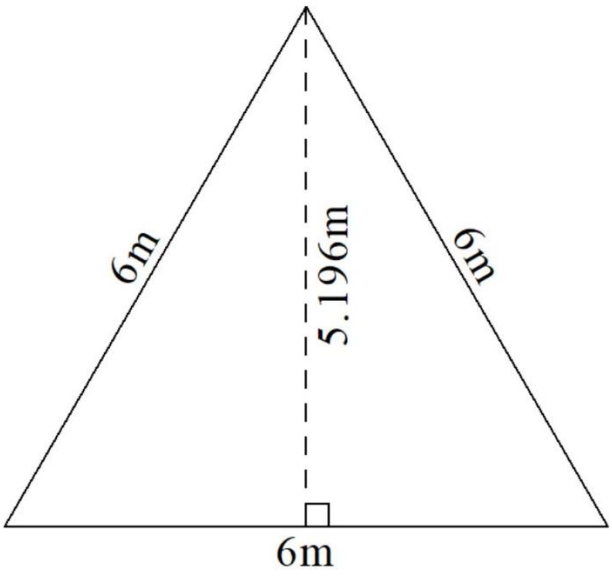
We will leave home at 1:11PM =(2:00PM – 49 Minute) to reach the party venue on time.

QUESTION 6

Area of the triangular sides

Height (h) of the triangular side = $\sqrt{(6^2 - 3^2)}$

= 5.196m **or** ($\sqrt{27}$)m **or** ($3\sqrt{3}$)m



Area of one triangular side $= \frac{1}{2} \times$ base $\times$ height

$= \frac{1}{2} \times 6 \times 5.196$

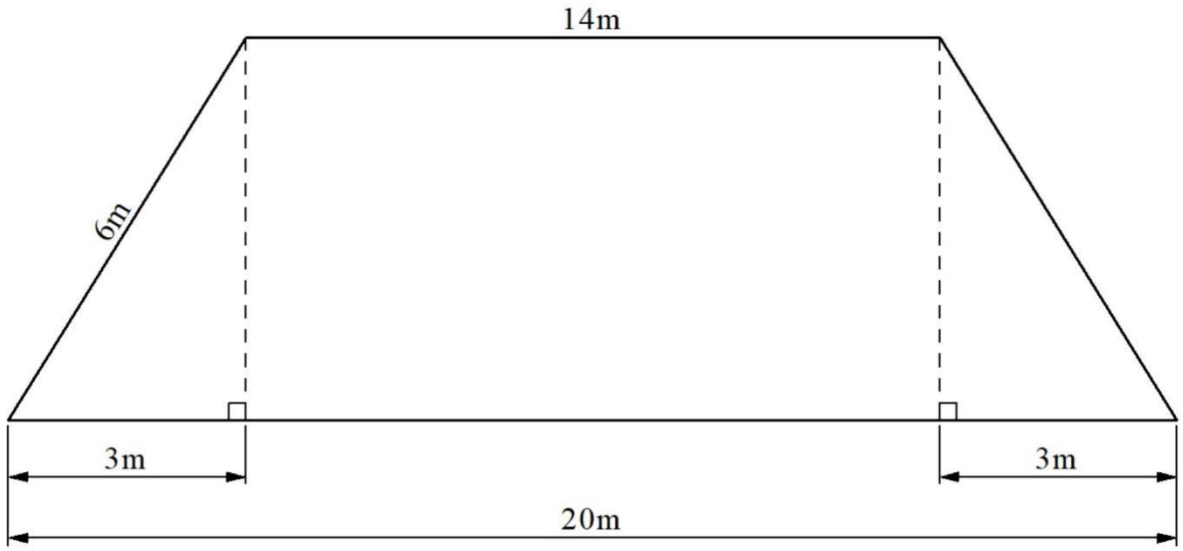
$= 15.588\text{m}^2$

Area of the two triangular sides = 2× 15.588

$= 31.176\text{m}^2$

Note: Accept any method of finding the area of the triangular side.

Area of the trapezium sides



Height(h)of the trapezium $= \sqrt{(6^2 - 3^2)}$

$= 5.196\text{m}$ **or** $(\sqrt{27})\text{m}$ **or** $(3\sqrt{3})\text{m}$

Area of one trapezium side $= \frac{1}{2} \times \text{h}\,(\text{a} + \text{b})$

$= \frac{1}{2} \times 5.196\,(14 + 20)$

$= 88.332\text{m}^2$

Area of the two trapezium sides = 2× 88.332

$= 176.664\text{m}^2$

Total area of the roof = 31.176 + 176.664

$= 207.84\text{m}^2$

Usable area of each iron sheet = (10×0.3)×(2.623×0.3)

= 2.3607m^2

Number of iron sheets = $\frac{\square\square\square\square\square\ \square\square\square\square\ \square\square\ \square\square\square\ \square\square\square\square}{\square\square\square\square\square\square\ \square\square\square\square\ \square\square\ \square\square\square\square\ \square\square\square\square\ \square\square\square\square\square}$

$= \frac{\mathbf{207.84}}{\mathbf{2.3607}}$

= 88.042

≈ 89

Cost of iron sheets

Type A	**Type B**
A discount of 6% on every 50 iron sheets	A discount of 10% on every 70 iron sheets
$(\frac{100-6}{100} \times 33{,}000 \times 50) + (89\text{-}50) \times 33{,}000$ =2,838,000/=	$(\frac{100-10}{100} \times 42{,}000 \times 70) + (89\text{-}70) \times 42{,}000$ =3,444,000/=

Advise: My neighbour should buy Type A iron sheets.

Reason: They are cheaper and she will minimise costs.

OR

Advise: My neighbour should buy Type B iron sheets.

Reason: Since they are expensive, they are likely to be of a better quality than Type A.

			SCORE
1	**TOTAL AREA OF THE ROOF**		
(a)	**Area of the triangular side**		**Subtotal- 04**
(i)	Height		01
(ii)	Substitution for Area		01
(iii)	Area	value	01
		unit	01
(b)	**Area of the trapezium side**		**Subtotal-04**
	Height		02
	Area	Use of formula	01
		Value	01
(c)	**Total area of the roof**	operation	01
		Correct value	01
2	**Usable area of the iron sheet**	Correct Value	01
3	**Conversion of units**	Correct value	01
4	**Number of iron sheets**	operation	01
		Correct value	01
		Actual number	01
5	**Cost of the iron sheets**		**Subtotal-03**
	Correct total cost without discount		01
	Discounted cost	operation	01
		Correct value (for either)	01
			Subtotal-02
6	**Advice/Justification**	Type of iron sheet	01
		Reason	01
TOTAL SCORE			**20**