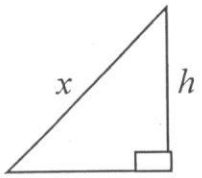
WAKISSHA
MARKING GUIDE
Uganda Certificate of Education
MATHEMATICS 456/1

1.	$(x+5+x+2)(x+5-x-2)$ $=(2x+7)(3)$ $=3(2x+7)=9$ $2x+7=3$ $2x=-4$ $x=-2$	m_1 A_1 m_1	Factors C's factors $=9$
		4	marks
2.	$2*1=2^2-1-3$ $9*Z=9^2-b=76$ $81-Z=76$ $Z=81-76$ $=5$	m_1 A_1 m_1 A_1	
		4	marks
3.	Number of sides $=\frac{360}{18}=20$. Sum of interior angle $=(180-18)\times 20$ $=162\times 20=3240^0$	m_1 A_1 m_1 A_1	Accept of alternative
		4	marks
4.	$2x+5y=11 \quad \times 1$ $3x-y=8 \quad \times 5$ $2x+5y=11$ $15x-5y=40$ $17x=51$ $x=3$ $y=1$	m_1 m_1 A_1 A_1	Accept of alternative
		4	marks
5.	$\begin{pmatrix}2\\-4\end{pmatrix}+\begin{pmatrix}9\\b\end{pmatrix}=\begin{pmatrix}4\\5\end{pmatrix}$ $2+a=4$ $a=2$ $-4+b=5$ $b=9$ $(2,9)$	m_1 A_1 m_1 A_1	Equation Equation
		4	marks

6.	$m^{-1} = \frac{1}{18-16}\begin{pmatrix} 2 & 2 \\ 8 & 9 \end{pmatrix}$ $= \frac{1}{2}\begin{pmatrix} 2 & 2 \\ 8 & 9 \end{pmatrix}$ $= \begin{pmatrix} 1 & 1 \\ 4 & 4.5 \end{pmatrix}$	m_1 m_1 m_1 A_1	Determinant a found Simplification
		4	marks
7.	$x = \frac{126}{2} = 63^0$ $y = 180 - 63$ $= 117^0$	m_1 A_1 m_1 m_1	C's 63
		4	marks
8.	 12cm $\frac{1}{2}$ $x12h = 60$ 12 h = 120 h = 10cm Hypotonic = x^2 $x = \sqrt{12^2 + 10^2}$ $= \sqrt{244} = 15.62$	m_1 m_1 m_1 A_1	
		4	marks
9.	$\frac{14X2p + 15Xp + 16X10}{2p + p + 10} = 15$ $\frac{28p + 15p + 160}{3p + 10} = 15$ $43p + 160 = 15(3p + 15)$ $43p + 160 = 45p + 150$ $2p = 10.$ $p = 5$	m_1 m_1 m_1 A^1	Expression Simplification Like terms
		4	marks
10.			

+	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

B_2

	$\frac{n(E)}{n(s)} = \frac{15}{36} = \frac{5}{12}$	m_1 A_1	
		4	Marks

SECTION B

11.

x	-4	-3	-2	-1	0	1	2	3	4
$y = x^2 + x - 8$	4	-2	- 6	- 8	- 8	- 6	- 2	4	12
$y = 4 - x - x^2$	- 8	- 2	2	4	4	2	- 2	- 8	-16

B_2

B_2

(b) refer to graph paper B_2 $y = x^2 + x - 8$

(c) $x_1 = {}^{-}3$ B_2 $y = 4 - x - x^2$

$x_2 = 2$ B_2 from correct graph

12. (a) The 4 x 4 matrix is

$$\begin{matrix} P \\ Q \\ R \\ S \end{matrix}\begin{pmatrix} 3 & 5 & 10 & 3 \\ 0 & 0 & 0 & 1 \\ 5 & 1 & 0 & 0 \\ 4 & 3 & 6 & 1 \end{pmatrix}$$ B_2

(b) (i) The cost matrix

$$\begin{matrix} B \\ M \\ P \\ MLT \end{matrix}\begin{pmatrix} 250,000 \\ 60,000 \\ 20,000 \\ 70,000 \end{pmatrix}$$ B_2

(ii)

$$\begin{pmatrix} 3 & 5 & 10 & 3 \\ 0 & 0 & 0 & 1 \\ 5 & 1 & 0 & 0 \\ 4 & 3 & 6 & 1 \end{pmatrix}\begin{pmatrix} 250.000 \\ 60.000 \\ 20.000 \\ 70.000 \end{pmatrix}$$ m_1

$$\begin{matrix} P \\ Q \\ R \\ S \end{matrix}\begin{pmatrix} 1,520,000 \\ 90,000 \\ 1,310,000 \\ 1,390,000 \end{pmatrix}$$ A_1

He spent 1,520,000 at P B_1

90,000 at Q B_1

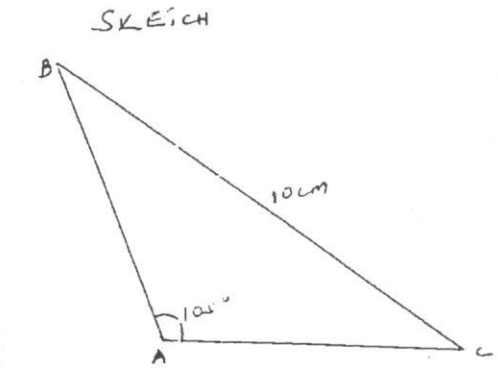
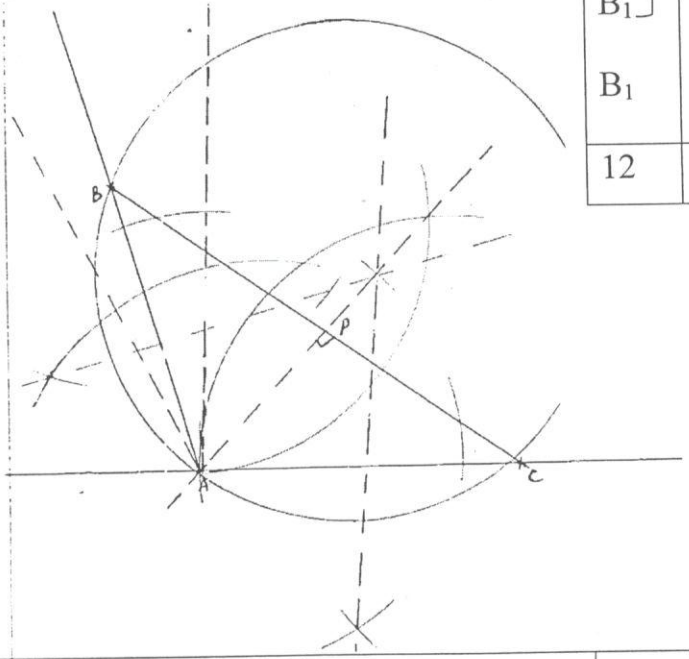
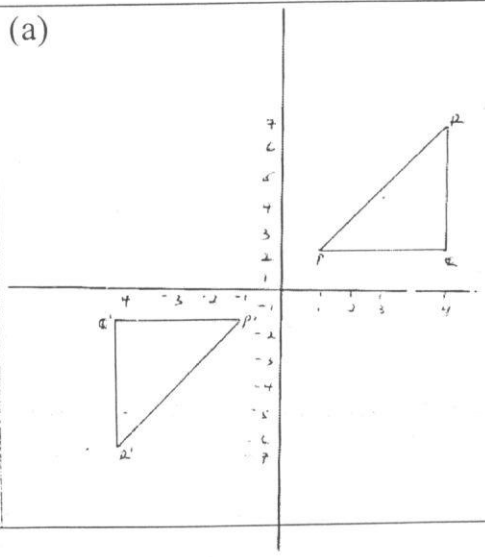
1,310,000 at R B_1

1,390,000 at S B_1

(c) total spent

$= 1,525,000 + 90,000 + 1,310,000 + 1,390,000$ M_1

$= 4,310,000$ A_1

		12	marks
13.	Sketch  $A = \frac{1}{2} \times 5 \times 3.9$ $= 19.5 = 0.5$  	B_1 B_1 B_1 B_1 B_1 B_1 M1 A1 B_1 B_1 B_1	Sketch AB = 6cm BC = 10cm arc seen $\angle BAC = 105^0$ arc seen Perpendicular on BC from A arc seen point P AB = 3.9cm ± 0.1 Perpendicular Bisectors on ABC Radius = 5.1 ± 0.19
		12	marks
14.	(a)  	B_2 B_2	Sketch of PQR (on graph paper) $P^1 Q^1 R^1$ on graph paper

	(b) Rotation through 180^0 (half turn) about the origin.	B_2	
	(c) Matrix for half turn is $\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$	B_2	
	(d) Matrix that maps PQR onto P^{II} Q^{II} R^{II} is $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}, \begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$	M_1	
	$= \begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$	A_1	
	Matrix that maps P^{II} Q^{II} R trade on to PQR is	M_1	
	$\frac{1}{-1} \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} = \begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$	A_1	
15.	(a)		

Marks	f	Class Mark x	x − A (d)	fd
10 − 14	5	12	−15	−75
15 − 19	6	17	−10	−60
20 − 24	10	22	−5	−50
25 − 29	20	27	0	0
30 − 34	5	32	5	25
35 − 39	2	37	10	20
40 − 44	2	42	15	30
	50			Σfd = −110

	B_1	Class mark
	B_1	x − A
	B_1	$\sum f = 50$
	B_1	Fd
	B_1	$\sum fd = 110$

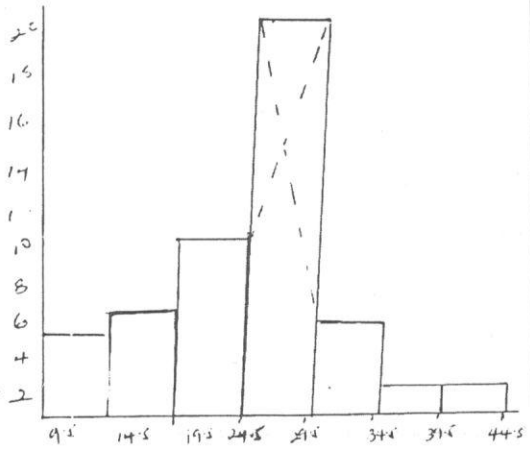
$$\text{Mean} = 27 + \frac{-110}{50}$$

$$= 27 - 2.2$$

$$= 24.8$$

M_1 A_1

(b)



B_1 Boundaries

B_2 Bars

(Graph paper)

(c) Modal mark = 24.9 ± 3.1 B_2

16.	(a) $(c+d)\ (c-d) = 60$ $30(c-d) = 60$ $(c-d) = 2$ .....(1) $(c+d) = 30$ .....(1) $2c = 32$ $c = 16$ $16 - d = 2$ $d = 14$ (b) let r = rice, p = posho $3r + 2p = 10,000$ / x2 $2r + 3p = 9,500$ / x3 $6r + 4p = 20,000$ $6r + 9p = 28,500$ $5p = 8,500$ $= p = 1,700r$ $6r + 4 \times 1,700 = 20,000$ $6r + 6.800 = 20,000$ $6r = 13,200$ $r = 2,200p$	M_1 M_1 M_1 A_1 M_1 A_1 M_1 M_1 M_1 A_1 M_1 A_1	Factorization Substitution
		12	marks
17.	(a) The inequalities $50x + 75y \geq 600,000$ $10x + 15y \geq 120$ .....(i) $40,000x + 50,000 \leq 600,000$ $4x + 5y \leq 60$ .....(ii) $x \leq 7$ .....(iii) $y \leq x$ .....(iv) (b) ..... graph paper $10x + 15y = 120$ line shading $4x + 5y = 60$ line shading Y = x line and shading Y = 7 line and shading (c) Minimum at (6, 4) 6 trips of truck A 4 trips of truck B	 B_1 B_1 B_1 B_1 B_1 B_1 B_1 B_1 B_1 B_1	
		12	marks

Q 17.