

MANGU HIGH SCHOOL TRIAL 2 MOCK 2021

121/1

MATHEMATICS ALT A.

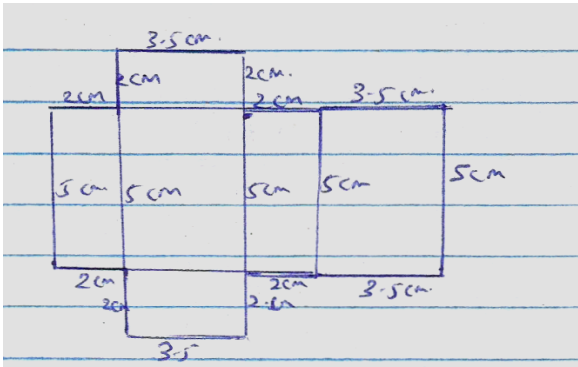
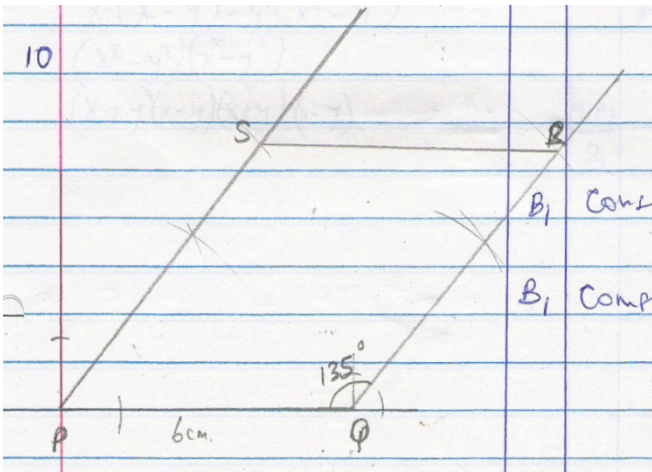
PAPER 1

OCT/NOVERMBER 2021

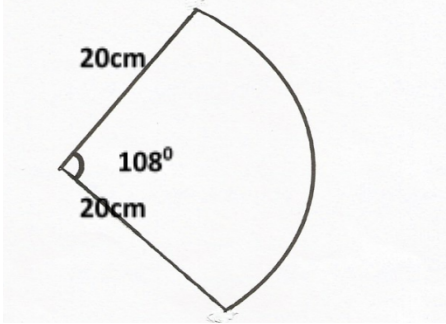
MARKING SCHEME

	SOLUTION	MARK	COMMENTS
1.	$-2(5+3) - 9 \div 3 + 5$ $-16 - 3 + 5$ $-19 + 5 = -14$ —————→ M1 $-3 + 2 \times 4$ $-3 + 8 = 5$ —————→ M1 $-\frac{14}{5}$ $= -2\frac{4}{5}$ —————→ A1		Numerator Denominator $-\frac{14}{5}$ A0 Accept -2.8
		3	
2.	$\frac{1}{6} + \frac{1}{12} = \frac{2+1}{12} = \frac{3}{12}$ $\frac{4}{9} \times \frac{9}{12} = \frac{1}{3}$ —————→ B1 $\frac{1}{6} + \frac{1}{12} + \frac{1}{3} = \frac{2+1+4}{12} = \frac{7}{12}$ $1 - \frac{7}{12} = \frac{5}{12}$ —————→ B1 $\frac{12}{5} \times 10$ —————→ M1 24 ha —————→ A1		Fraction for grazing Fraction for unused land.
		4	
3.	$2y + 3x = 11$ $y = -\frac{3x}{2} + \frac{11}{2}$ $M_1 = -\frac{3}{2}$ $M_2 = \frac{2}{3}$ —————→ B1 $\frac{y+4}{x+3} = \frac{2}{3}$ $3y - 2x = -6$ —————→ B1 A(3,0) B(0, -2) —————→ B1		Check equivalents. For both coordinates of A and B.
		3	
4.	Kitale 400 km Lodwar 8.00 a.m. 8.30 Bus Car 80 km/h 120 km/h $\frac{30}{60} \times 80 = 40$ $400 - 40 = 360$ —————→ B1 Relative speed $120 + 80 = 200$ —————→ B1		

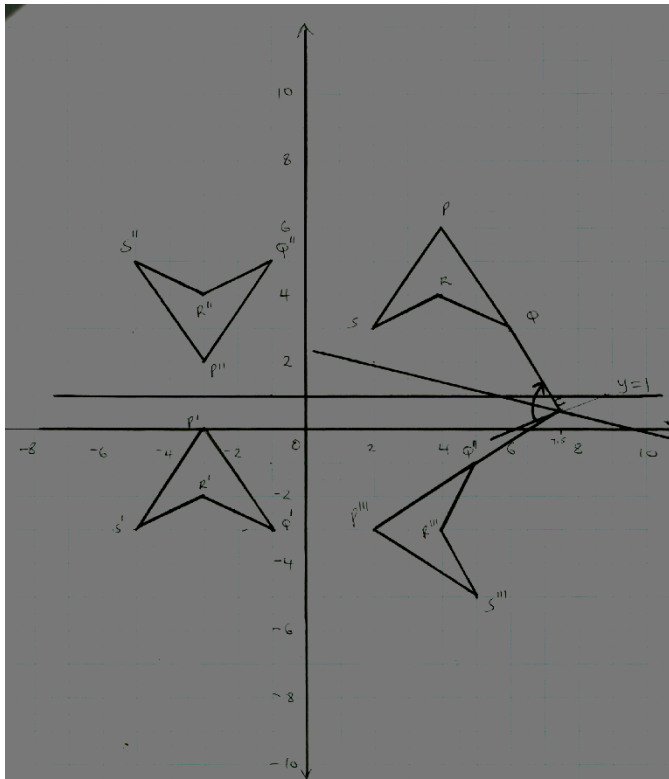
	$T = \frac{360}{200} = 1.8 \text{ hrs}$ $1\text{hr } 48 \text{ min.}$ 8.30 $+ \underline{1.48}$ 10.18 10.18 am	B1	Must have units
		3	
5.	$x + x + 2 + x + 4 + x + 6 > 24$ $4x + 12 > 24$ $4x > 12$ $x > 3$ $5, 7, 9, 11$	M1 A1 B1	All four correct
		3	
6.	$1 \text{ Euro} = \text{ksh } 112.32$ $6000 \text{ Euros} =$ 6000×112.32 673920 $673920 - 260,000$ $= 413920$ $\text{Ksh } 96.90 = 1 \text{ US dollar}$ $\text{Ksh. } 413920 =$ $\frac{413920 \times 1}{96.90}$ 4271.62	M1 A1 M1 A1	
7.	$\mathbf{AB = OC - OA}$ $= \begin{matrix} -3 & -6 \\ 1 & -2 \end{matrix}$ $= \begin{matrix} 3 \\ 2 \end{matrix}$ $\mathbf{AC = 3AB}$ $= 3 \begin{matrix} 3 \\ 2 \end{matrix}$ $= \begin{matrix} 9 \\ 6 \end{matrix}$ $\mathbf{OC = OA + AC}$ $= \begin{matrix} -6 & + & 9 \\ -2 & & 6 \end{matrix}$ $= \begin{matrix} 3 \\ 4 \end{matrix}$ $\therefore \mathbf{C(3,4)}$	M1 M1 A1	
		3	
8.	$8^{2/3} y^{2/3} \times y^{4/3} - 6 \div 2y^{-2}$ $= 2^2 \times y^{6/3} - 6 \div \underline{2}$	M1	

	$= 4y^2 - 6 \times \frac{y^2}{2}$ $= 4y^2 - 3y^2$ $= y^2$	y^2	M1	
			A1	
			3	
9.	 S.A = $(5 \times 3.5 \times 2) + (5 \times 2 \times 2) + (3.5 \times 2 \times 2)$ $= 35 + 20 + 14$ $= 69 \text{ cm}^2$	B1	Complete and ✓ labelled diagram	
			M1	
			A1	
			3	
10.	 QS = $4.8 \pm 0.1 \text{ cm}$	B1	Construction of $\angle 45^\circ$	
			B1	Completion of PQRS.
			B1	Measure of the shortest diagonal SQ.
			3	
11.	No. of oranges sold on Saturday; $\frac{6144}{8} = 768$ No. of oranges that remained on Friday; $768 - 560 = 208$ No. of oranges bought on Thursday . $208 + 750 + 750 + 240$ $= 1948$	M1	✓ division	
			M1	✓ subtraction
			M1	✓ Addition
			A1	
			4	
12.	$x^4 - x^2y^2 - x^2y^2 + y^4$ $x^2(x^2 - y^2) - y^2(x^2 - y^2)$ $(x^2 - y^2)(x^2 - y^2)$ $(x + y)(x - y)(x + y)(x - y)$	M1	Award marks for working by inspection	
			A1	
			2	
13.	$\sin(3y - 50^\circ) = \cos(2y + 10^\circ)$ $3y - 50^\circ + 2y + 10^\circ = 90^\circ$ $5y - 40^\circ = 90$	M1		
			M1	

	$5y = 130^0$ $y = 26^0$	A1	
		3	
14.	S.A of solid = $\pi r l + 2\pi r^2$ $= 3.142 \times 6 \times 10 + 2 \times 3.14 \times 6^2$ $= 188.52 + 226.224$ $= 414.744$ $= 414.74 \text{ cm}^2$ (2 d.p)	M1M1 A1	Exp. Of areas Addition of areas
		3	
15.	Length of an arc = $\theta^c r$ Let OA = x $\frac{2x}{5} + \frac{2}{5}(x + 5) = 14$ $2x + 2x + 10 = 70$ $4x = 60$ $x = 15$ $\therefore \text{OA} = 15 \text{ cm}$	M1 M1 A1	Perimeter Solving
		3	
	16. $L_1 = x \geq 0$ L_2 (0, 4) (5, 0) $\frac{0 - 4}{5 - 0} = \frac{-4}{5}$ $\frac{y - 0}{x - 5} = \frac{-4}{5}$ $5y = -4x + 20$ $5y < -4x + 20$ $y < \frac{-4}{5}x + 4$ B1		
		3	
17.	a)Commission $480,000 - 120,000 = 360,000$ $\frac{8}{100} \times y = 360,000$ $y = \frac{360,000 \times 100}{8}$ $y = 4,500,000$ $1,000,000 + 4,500,000$ $5,500,000$ b) (i) $\frac{118}{100} \times 5,500,000$ $6,490,000$ $\frac{8}{100} \times (6,490,000 - 1,000,000)$ $\frac{8}{100} \times 5,490,000$ $= 439200$ (ii) $\frac{70}{100} \times 6,490,000$	M1 M1 M1 A1 M1 M1 A1 M1	Process of finding 4,500,000 Summation

	$\frac{100}{4,543,000} \times (4,543,000 - 1,000,000)$ $\frac{80}{100} \times 3,543,000$ $= 283,440$ $120,000 + 283,440$ $= 403,440$	M1 A1	
		10	
18.	(a)  $\frac{108}{360} \times \frac{22}{7} \times 20 \times 20$ $= 377.14$ (b) $377.14 = \frac{22}{7} \times r \times 20$ $r = \frac{377.14 \times 7}{22 \times 20}$ $r = 6$ (c) $h^2 + 6^2 = 20^2$ $h = \sqrt{20^2 - 6^2}$ $h = 18$ (d) $\frac{18}{12} = \frac{6}{r}$ $r = 4$ Volume of smaller cone = $\frac{1}{3} \pi (4)^2 \times 12$ Volume of larger cone = $\frac{1}{3} \pi (6)^2 \times 18$ $\frac{1}{3} \pi (6)^2 \times 18 - \frac{1}{3} \pi (4)^2 \times 12$ $= 477.71$	M1 A1 M1 M1 A1 M1 A1 M1 A1	$\pi \text{ cal} = 3.76.99$ $\pi = 3.142 = 377.04$ Follow through. Follow through. Expressions for the two volumes. Subtraction Expression for the 2 Volume Subtraction $\pi \text{ cal} = 477.52$ $\pi = 3.142 = 477.584$
		10	
19.	(a) Det. $42 - 20 = 22$ Inverse $A^{-1} = \frac{1}{22} \begin{pmatrix} 7 & -5 \\ -4 & 6 \end{pmatrix}$ (b) (i) $\begin{pmatrix} 6 & 5 \\ 4 & 7 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 520 \\ 530 \end{pmatrix}$ (ii) $\frac{1}{22} \begin{pmatrix} 7 & -5 \\ -4 & 6 \end{pmatrix} \begin{pmatrix} 6 & 5 \\ 4 & 7 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{22} \begin{pmatrix} 7 & -5 \\ -4 & 6 \end{pmatrix} \begin{pmatrix} 520 \\ 530 \end{pmatrix}$	B1 B1 B1	Alt

The diagram shows a frame structure with a vertical column and a horizontal beam. The column has a height of 9.6m, and the beam has a length of 6m. A point load of 5.8 is applied at the top of the column. A horizontal load of 5.4 is applied at the end of the beam. The diagram includes the frame, its projections, and the applied loads.



22.

(a) Time (Min)	f.	x	fx	cf
11 – 20	70	15.5	1085	70
21 – 30	100	25.5	2550	170
31 – 40	200	35.5	7100	370
41 – 50	100	45.5	4550	470
51 – 60	<u>30</u>	55.5	<u>1665</u>	500

$$\Sigma f = 500 \quad \Sigma fx = 16950$$

$$\text{Mean, } \bar{x} = \frac{\Sigma fx}{\Sigma f}$$

$$\Sigma f$$

$$= \frac{16950}{500}$$

$$= 33.90$$

B1

B1

B1

B1

f column

x column

fx column

 Σf and Σfx

23.

$$(b) \text{ Median position} = \frac{500}{2} = 250^{\text{th}}$$

Median class: 31 – 40

$$\text{Median value} = 30.5 + \frac{250 - 170}{200} \times 10$$

$$= 30.5 + \frac{80}{200} \times 10$$

M1

A1

 $\sqrt{\text{exp. For } \bar{x}}$

