

SAMIA SUB – COUNTY JOINT EVALUATION TEST – 2021
Kenya Certificate of Secondary Education (K.C.S.E)

MARKING SCHEME

121/1

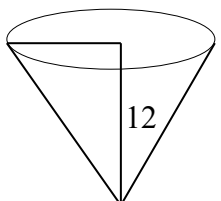
MATHEMATICS

PAPER 1

MATHEMATICS



1.	$\frac{4 \text{ of } (-4 - 3) + 3 - 2}{-12 + 3 + 5}$ $\frac{4 \text{ of } (-7 - 3 - 2)}{-4}$ $\frac{48}{-4} = -12$	M1 M1 A1	For numerator For denominator
		03	
2.	<p>Nume $(3x + 1)(3x - 1)$ Den $(3x - 1)(x + 1)$</p> $\frac{(3x + 1)(3x - 1)}{(3x - 1)(x + 1)}$ $\frac{3x + 1}{x + 1}$	M1 M1 A1	
		03	
3.	$\frac{4}{11} \times \frac{14}{20}$ $\frac{10}{3} \div \frac{11}{10}$ $= \frac{4}{7} \times \frac{7}{10} \times \frac{33}{100}$ $= \frac{21}{250}$	M1 A1	V removal of brackets Simplified fraction
		02	
4.	<p>No . of hens = $20t$, number of ducks = $\frac{3t}{4}$</p> <p>Total No = $t + 20t + \frac{3}{4}t$ = $21\frac{3}{4}t$</p> <p>$\frac{3}{4}t = 72$ $t = 96$</p> <p>Hens = 1920 $\frac{96 + 72}{100} \times 100$ = 1920 = 8.75%</p>	B1 M1	Turkey and hens

		A1	
		03	
5.	$5 + 12$ $0.1396 + 0.593$ $65(7,161) + 12(1.686)$ $35.805 + 20.232$ $=56.037$	M1 M1 A1	
		03	
6.	$M = -2 + 4, 6 + 2$ $\quad \quad \quad 2 \quad \quad 2$ $=(1,4)$ $g_1 = \frac{-2}{3}$ $g_2 = \frac{3}{2}$ $\frac{y-4}{x-1} = \frac{3}{2}$ $2y = 3x + 5$	M1 A1 M1 A1	
		04	
7.	 <p>S.A = $\pi r l$</p> $l = \sqrt{5^2 + 12^2}$ $=13\text{cm}$ $\text{S.A} = 3.142 \times 5 \times 13$ $= 204.23$	B1 M1 A1	2x
		03	
8.	<p>Let t and p be the cost of a text book and a pen respectively.</p> $3t + 5p = 970 \dots\dots\dots(i)$ $2t + 8p = 880 \dots\dots\dots(ii)$ <p>Multiply (i) by 8 and (ii) by 5</p> $24t + 40p = 7760$ $\underline{10t + 40p = 4400}$ $104t = 3360$ $t = 240$	B1 M1 A1	For both V attempt to solve for t
		03	
9.	$\angle BOA = 80 \times 2 = 160^\circ$ $\text{Obtuse } \angle BOA = 200^\circ$ $\text{Therefore } \angle OAC + 80^\circ + 200^\circ + 10^\circ = 360^\circ$ $\angle OAC = 360^\circ - 290^\circ$ $= 70^\circ$ $\angle CAB = 70 + \frac{(180 - 160)}{2}$ $= 80^\circ$	B1 B1 B1	

		03																															
10. (a)	<table border="1"> <thead> <tr> <th>Speed</th> <th>30</th> <th>40</th> <th>50</th> <th>60</th> <th>70</th> <th>80</th> <th>90</th> <th>100</th> <th>110</th> </tr> </thead> <tbody> <tr> <td>Freq</td> <td>1</td> <td>4</td> <td>9</td> <td>14</td> <td>38</td> <td>47</td> <td>51</td> <td>32</td> <td>4</td> </tr> <tr> <td>Fx</td> <td>30</td> <td>160</td> <td>450</td> <td>840</td> <td>2660</td> <td>3760</td> <td>4590</td> <td>3200</td> <td>440</td> </tr> </tbody> </table> <p> $\Sigma fx = 200$ $\Sigma fx = 16,130$ </p> $\frac{\Sigma fx}{\Sigma f} = \frac{16130}{200}$ $= 80.65$	Speed	30	40	50	60	70	80	90	100	110	Freq	1	4	9	14	38	47	51	32	4	Fx	30	160	450	840	2660	3760	4590	3200	440	B1 M1	
Speed	30	40	50	60	70	80	90	100	110																								
Freq	1	4	9	14	38	47	51	32	4																								
Fx	30	160	450	840	2660	3760	4590	3200	440																								
(b)	90km/h	A1 B1																															
		04																															
11.	$\left(\frac{3^3}{2^3}\right)^{x+7} = \left(\frac{2^2}{3^2}\right)^{-3x}$ $\left(\frac{3}{2}\right)^{3(x+7)} \left(\frac{3}{2}\right)^{6x}$ $3(x+7) = 6x$ $3x + 21 = 6x$ $3x = 21$ $x = 7$	M1 M1 A1																															
		03																															
12.	$\begin{pmatrix} 1 \\ 2 \end{pmatrix} + T = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$ $T = \begin{pmatrix} -1 \\ 2 \end{pmatrix} - \begin{pmatrix} 1 \\ 2 \end{pmatrix}$ $= \begin{pmatrix} -2 \\ 0 \end{pmatrix}$ $\begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} -2 \\ 0 \end{pmatrix} = \begin{pmatrix} -3 \\ -3 \end{pmatrix}$ $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -3 \\ -3 \end{pmatrix} - \begin{pmatrix} -2 \\ 0 \end{pmatrix}$ $= \begin{pmatrix} -1 \\ -3 \end{pmatrix}$ <p>R(-1, -3)</p>	B1 M1 A1																															
		03																															
13. (a)	$= \frac{1}{2} \times 4 \times 80 + 80 \times 16 + \frac{1}{2} \times 4 \times 80$ $= 160 + 1280 + 160$ $= 1600\text{m}$	M1																															
(b)	$a = \frac{-80}{4} = 20\text{m/s}^2$	A1 M1 A1																															

		04																					
14.	<p>L.C.M of 50 and 80 =400</p> <p>Number of poles = $\frac{400}{50} + \frac{400}{8}$ = 13</p>	B1 M1 A1																					
		03																					
15.	<p>Ext + Interior = 180°</p> <p>$\frac{1}{3}x + x = 180$</p> <p>$\frac{4}{3}x = 180$</p> <p>$x = \frac{180 \times 3}{4}$</p> <p>Exterior = $1 \times 135 = 4500$</p> <p>No. of sides = $\frac{360}{45}$ = 8 sides</p>	B1 M1 A1																					
		03																					
16.	<p>$12 - 2x > 18x - 8 \geq 28 - 2x$</p> <p>$12 + 8 > 18x + 2x$</p> <p>$x < 1$</p> <p>$18x + 2x \geq -28 + 8$</p> <p>$x \geq -1$</p> <p>$-1 \leq x < 1$</p> <p>Integral values are 0 and -1</p>	B1 B1 A1																					
		03																					
17.	<table border="1"> <tr> <td>x</td> <td>-3</td> <td>-4</td> <td>1</td> <td>4</td> </tr> <tr> <td>$-2x^2$</td> <td>-18</td> <td>-2</td> <td>-2</td> <td>-32</td> </tr> <tr> <td>2x</td> <td>-6</td> <td>-2</td> <td>2</td> <td>8</td> </tr> <tr> <td>y</td> <td>-17</td> <td>3</td> <td>7</td> <td>-17</td> </tr> </table> <p>(b) (i)</p> <p>(ii) $x = -15$ or 2.5</p> <p>(c) (i) $7+2x - 2x = 9 + 5x - 2x^2$ $y = -3x - 2$ $x = -1.2$ or 3.7</p> <p>(ii) $(0.5, 7.5)$</p>	x	-3	-4	1	4	$-2x^2$	-18	-2	-2	-32	2x	-6	-2	2	8	y	-17	3	7	-17	B1B1 S1 P1 C1 L1 B1 M1 B1 B1	Correct line drawn
x	-3	-4	1	4																			
$-2x^2$	-18	-2	-2	-32																			
2x	-6	-2	2	8																			
y	-17	3	7	-17																			
		10																					

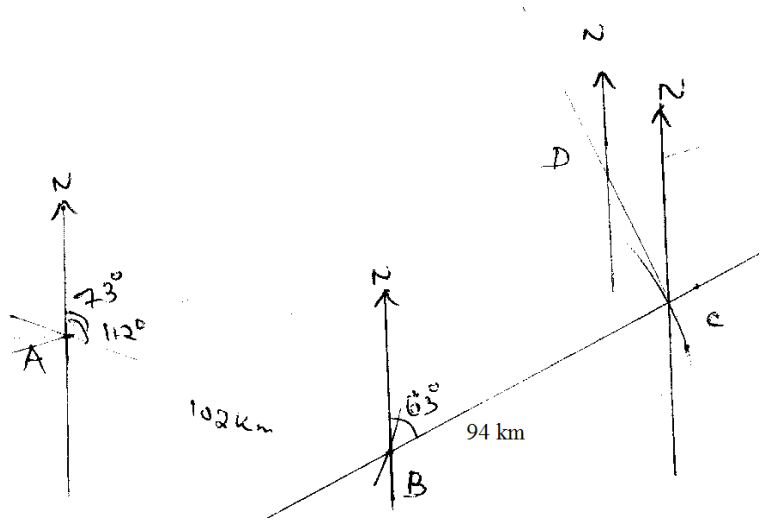
18.	$48000 - 20000 = 28000$ $\frac{8}{100} \times x = 28000$ $x = 28000 \times \frac{100}{8}$ $= \text{sh. } 350,000$ $\text{Sales} = 350\,000 + 100\,000 = 450\,000$ <p>(i) Sales for feb</p> $\frac{118}{100} \times 480\,000$ $= 531\,000 - 100\,000$ $= 431\,000 \times \frac{8}{100}$ $= 34,480$ <p>(ii) $= \frac{75}{100} \times 531\,000$</p> $= \text{sh. } 398\,250$ $\text{Commission} = 298\,250 \times \frac{8}{100}$ $= 23,860$ $\text{sh } 23860 + 20\,000$ $= 43\,860$	M1 M1 M1 A1 M1 M1 A1 M1 A1	
		10	
19.	V.S.F = 512000: 100000 512: 1000 64: 125 $4^3: 5^3$ L.S.F Height of small tank = $\frac{4 \times 300}{5}$ = 240cm A.S.F = 16: 25 S.A of the large tank = $\frac{25 \times 768}{16}$ = 1200m ² Mass of smaller tank = $\frac{125 \times 800}{64}$ = 1562	M1 M1 M1 B1 B1 M1 A1 M1 A1	
		10	

<p>20</p>			
<p>21(a)</p>	<p> $\cos \theta = \frac{250^2 + 320^2 - 440}{2 \times 250 \times 320}$ $= 100.33^\circ$ </p> <p>(b)</p> <p> $A = \frac{1}{2} \times 250 \times 320 \sin 100.33^\circ$ $= \frac{39351.65}{10000}$ $= 3.9352 \text{ha}$ </p> <p>(c)</p> <p> $2R = \frac{440}{\sin 100.33}$ $R = 223.6$ $A = \frac{22}{7} \times 223.6^2 - 39351.65$ $= 117781.7 \text{m}^2$ </p>	<p>M1</p> <p>A1</p> <p>M1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>M1</p> <p>B1</p> <p>M1</p> <p>M1</p> <p>A1</p>	<p>Area of circle diff.</p>
		<p>10</p>	

22(a)	$\text{Time the arrives in NBI} = \frac{400}{120}$ $= 3\text{hrs } 20 \text{ min}$ $\text{Time} = 8.20\text{am} + 3.20\text{min}$ $= 11.50\text{am}$	M1 A1 B1	
(b)	Distance covered by the bus in 30min $= \frac{1}{2} \times 80 = 40\text{km}$ Time taken to meet = $\frac{\text{Distance}}{\text{R.S}}$ $= \frac{360}{200}$ $= 1\text{hr } 48\text{min}$	B1 M1 A1	
(c)	Distance = $40 + \frac{9}{5} \times 80$ $= 40 + 144$ $= 184\text{km}$	M1 A1	
(d)	Distance = $80 \times \frac{23}{6}$ $= 360 \frac{2}{3} \text{ km}$	M1 A1	

10

23(a)			
-------	--	--	--



- (i) Bearing of B from D = 212 ± 1^1
- (ii) Bearing of A from C = 269 ± 1^0
- (iii) Distance of A from C = $8.4\text{cm} \pm 0.1\text{cm}$
 $= 168\text{km} \pm 2$
- (iv) B from D = $4.8\text{cm} \pm 0.1\text{cm}$
 $= 96\text{km} \pm 2$

B1
B1
B1
B1
B1

10

24(a)	$S = 5^3 - 5(5)^2 + 3(5) + 4$ $S = 19$	M1 A1	
(b)	$V = \frac{ds}{dt} = 3t^2 - 10t + 3$ $= 3(5)^2 - 10(5) + 3$ $= 28\text{m/s}$	M1	
(c)	Moment at rest $V = 0$ $3t^2 - 10t + 3 = 0$ $(3t - 1)(t - 3) = 0$ $t = \frac{1}{3}$ or 3sec	M1 M1 A1	
(d)	Acceleration when $t = 2$ $a = \frac{dv}{dt} = 6t - 10$ $= 2\text{m/s}^2$	M1 A1	
		10	