

FORM FOUR END OF TERM TWO 2018 EXAMINATION

121 /1

MATHEMATICS MARKING SCHEME

PAPER 1

1.	$\left(\frac{9}{4} + \frac{3}{5} \div 2\right) \div \frac{17}{10}$ $= \left(\frac{9}{4} + \frac{3}{10}\right) \div \frac{17}{10}$ $= \frac{51}{20} \times \frac{10}{17}$ $= 1 \frac{1}{2}$	<p>M₁</p> <p>M₁</p> <p>A₁</p>	<p>numerator</p> <p>denominator</p> <p>C .A.O</p>
		3	
2.	<p>Grad AB = M₁ = $\frac{2+2}{6+4}$</p> <p>= $\frac{2}{5}$</p> <p>∴ M₂ = $-\frac{2}{5}$</p> <p>Mid point M $\left(\frac{-4+6}{2}, \frac{-2+2}{2}\right)$</p> <p>= (1 0)</p> <p>$\frac{y-0}{x-1} = \frac{-5}{2}$</p> <p>-5x + 5 = 2y</p> <p>2y + 5x - 5 = 0</p>	<p>B1✓</p> <p>B1✓</p> <p>B1</p>	<p>Both M1,&& M2</p> <p>Mid point</p>
		3	
3.	$\frac{1}{\sqrt{31.47}} + \frac{3}{(8.54)^2}$ $= \frac{1}{5.6098} + \frac{3}{72.93}$ $= 0.1783 + 3 (0.1373 \times 10^{-1})$	<p>M1✓</p> <p>M1✓</p> <p>M1✓</p>	<p>Use square root tables</p> <p>Use square tables</p> <p>Use rec. tables</p>

Get more resources from: [Enovate KCSE Revision App](https://www.enovate.co.ke/)

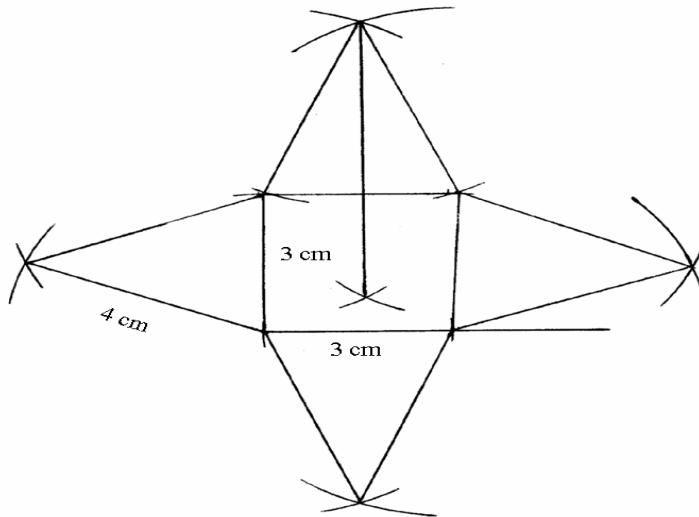
[highschool.co.ke](https://www.highschool.co.ke)

	$\tan 28 = \frac{300}{AQ} \quad AQ = 300 \div \tan 28$ $PQ = 564.22 - 270.12$ $= 294.10\text{m}$	M1 A1 3	For $\tan 48^\circ = \frac{300}{AP}$ For $\tan 28 = \frac{300}{AQ}$ Correct distance PQ
		3	
8.	Distance = 72 + 78 = 150M Relative speed = 72 + 108 = 180km/h $t = \frac{150}{1000} \times \frac{1}{180}$ $= 8.333 \times 10^{-4}$ $= 2.999$ $\approx 3 \text{ seconds}$	B1 B1 M1 A1	
		4	
9.	$\angle DBC = 51^\circ$ Alternate angles $\angle EAD = 51^\circ$ Alternate segment $\therefore x = 180 - (51 + 51)$ $= 78^\circ$	B1 M1 A1	
		3	

10.	A.S.F. = $\frac{25}{324}$ L.S.F. = $\sqrt{\frac{25}{324}}$ $= \frac{5}{18}$	B1	
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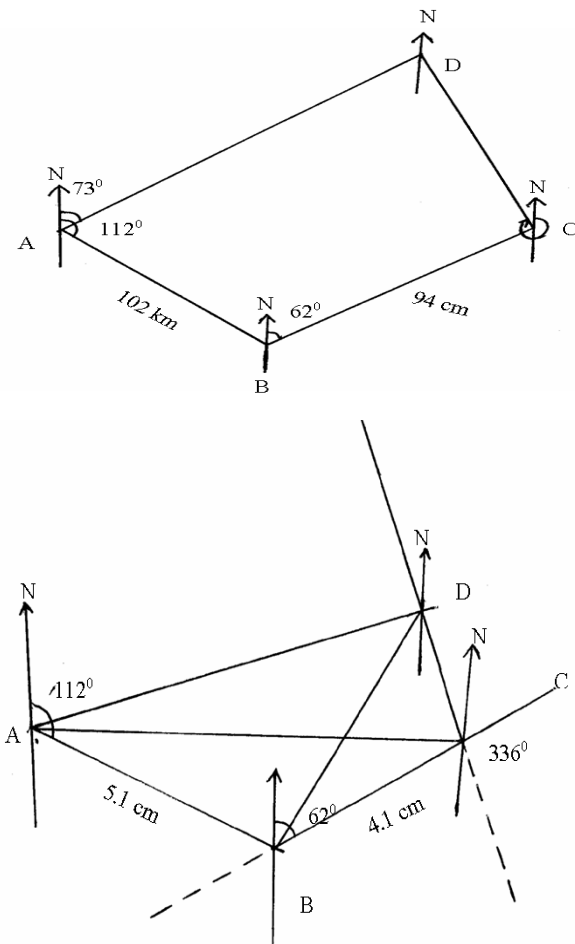
13.	$5000 \times 86.25 = \text{ksh}431250$ $\text{Spend} = \frac{289850}{141400}$ $\text{Remaining} =$ $100 \text{ Japanese yen} = 67.26$ $? = 141400$ $\frac{141400 \times 100}{67.26} = 210228.96 \text{ Japanese yens}$	B1 M1 A1	
		3	
14.	(a) 11, 13, 17 and 19 $\text{Number} = 19, 171, 311$ (b) hundreds total value = 3×100 $= 300$	B1 B1	
		2	
15.	$\log 36 = \log (4 \times 9) = \log 4 + \log 9$ $= \log 2^2 + \log 3^2$ $= 2\log 2 + 2\log 3$ $= 2(0.30103 + 0.47712)$ $= 1.556$	M1 M1 A1	
		3	

16.		B2	
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	 <p>c) Height = 3.7cm \pm 0.1cm</p>	B1	
		3	
17.	<p>(a) $\angle PAQ = 2PAM/2QAM$</p> $\sin \theta = \frac{4.5}{10.5} = 0.4286$ $\theta = 25.38$ $\times 2$ $\angle PAQ = 50.76^\circ$	<p>M1</p> <p>A1</p>	<p>Each A plotted NB: there are four triangles drawn</p> <p>A¹B¹C¹ coordinates</p>
	<p>(b) $PBQ = 2PBM/2QBM$</p> $\sin \chi = \frac{4.5}{8.4} = 0.5357$ $\chi = 32.39$ $\times 2$ $PBQ = 64.78^\circ$	<p>M1</p> <p>A1</p>	

(c)	<p><u>Segment 1</u></p> $A = A \sec_1 - AD_1$ $= \left(\frac{50.76}{360} \times \frac{22}{7} \times 10.5^2 \right) - \left(\frac{1}{2} \times 10.5^2 \times \sin 50.76 \right)$ 6.162 <p><u>Segment 2</u></p> $= \left(\frac{64.78}{360} \times \frac{22}{7} \times 8.4^2 \right) - \left(\frac{1}{2} \times 8.4^2 \times \sin 64.78 \right)$ $39.9045 - 31.9171$	<p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>M1</p>	
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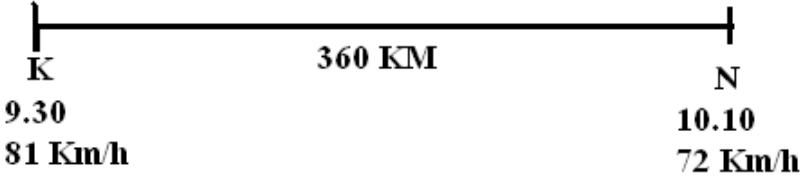
7.9874 Total shaded = $6.162 + 7.9874$ = 14.1494cm^2	A1	
	10	

18.	 <p>b) i) bearing of B from D $212^\circ \pm 1^\circ$ Bearing of A from C $269^\circ \pm 1^\circ$ ii) Distance AC and BD $AC = 8.4\text{cm} \pm 0.1\text{cm}$ $= 168 \pm 2$ $BD = 4.8\text{cm} \pm 0.1\text{cm}$ $= 96 \pm 2$</p>	<p>B1 B1</p> <p>B1 B1</p> <p>B1 B1</p> <p>B1 B1</p> <p>B1 B1</p>	
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		10	

19.	<p>(a) let group members no.=x</p> <p>Each original = $\frac{2000000}{x}$</p> <p>Contribution After 40 withdrawn</p> <p>Each contribution = $\frac{2000000}{x-40}$</p> <p>$\frac{2000000}{x} = \frac{2000000}{x-40} - 2500$</p> <p>$x(x-40)\frac{2000000}{x} = \left(\frac{2000000}{x-40}\right)x(x-40) - x(x-40)2500$</p> <p>$2000000x - 80000000 = 2000000x - 2500x^2 + 100000x$</p> <p>$25x^2 - 1000x - 800000 = 0$</p> <p>$x^2 - 40x - 32000 = 0$</p> <p>$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$</p> <p>$= \frac{40 \pm \sqrt{1600 + 4 \times 32000}}{2}$</p> <p>$= \frac{40 \pm \sqrt{129600}}{2}$</p> <p>$= \frac{40 \pm 360}{2}$</p> <p>$= \frac{400}{2} \text{ or } \frac{-320}{2}$</p> <p>$= 200 \text{ or } -160$</p> <p>$\therefore$ Original number of members = x = 200</p>	<p>B1</p> <p>M1</p> <p>M1✓</p> <p>A1</p> <p>B1</p> <p>B1</p> <p>B1</p>	<p>Btw</p> <p>Simpl.</p>
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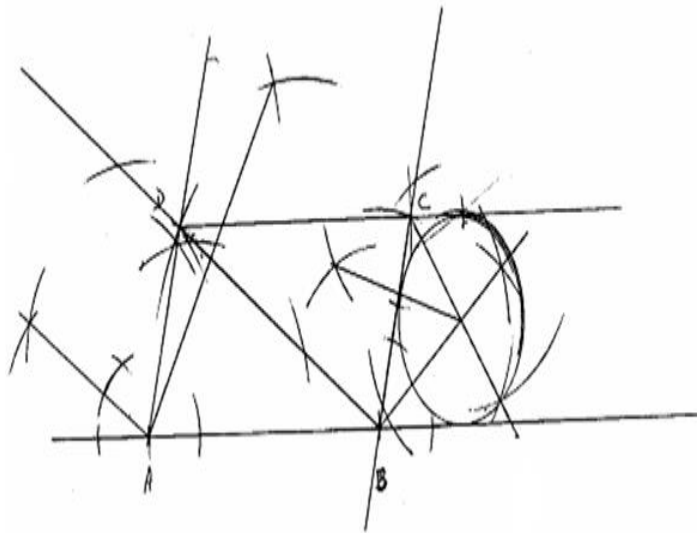
	<p>(b) Fund from CDF = $\frac{45}{100} \times 2000000$</p> <p>= 900000</p> <p>Remaining to be contributed.= 2000000- 900000</p> <p>= 1,100000</p> <p>Each remaining</p> <p>membersn contribution= $\frac{1100000}{200 - 40}$</p> <p>= $\frac{1100000}{160}$</p> <p>= 6875</p>	<p>B1</p> <p>M1</p> <p>A1</p>	
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	<p>(c) total amount</p> <p>contribution by members= $\frac{19}{25} \times 1100000$</p> <p>=836,000</p>		
		10	
20.	 <p>(a) (i) relative speed = 81+72</p> <p>= 153km/h</p> <p>After 40 minutes distance covered = $81 \times \frac{40}{60}$</p> <p>=54km</p> <p>Distance left = 360-54</p> <p>= 306 km</p> <p>$t = \frac{306}{153}$</p> <p>=2 hrs</p> <p>(ii) after meeting relative speed=153km/h</p> <p>= 102km</p> <p>ALTERNATIVE:</p>	<p>M1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p>	

	$\left(\frac{40}{60} \times 72\right) + \left(\frac{40}{60} \times 81\right)$ $= 48 + 54$ $= 102$ <p>(b) (i) Relative speed = 90 - 81 = 9 km/h</p> <p>20 min, distance covered = $\frac{20}{60} \times 90$</p> $t = \frac{30}{9}$ $= 3 \frac{1}{3} \text{ hrs}$ $= 3 \text{ hrs } 20 \text{ min}$ <p>9.50</p> <p>3.20</p> <p>13.10</p> <p>∴ 1.10 p.m.</p> <p>(ii)</p> $\begin{array}{r} 13.10 \\ - 9.30 \\ \hline 4.40 \end{array}$ $= 4 \frac{2}{3}$ $= \frac{14}{3} \text{ hrs}$	<p>B1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p>	
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	$D = 360 - \left(81 \times \frac{14}{3}\right)$ $= 360 - 108$ $= 252 \text{ km}$	<p>M1</p> <p>A1</p>	
		10	

21.



- B1 Constructing $\angle 75^\circ$
- B1 Complete triangle
- B1 Dropping the perpendicular
- B1 Complete parallelogram

- B1 Centre of the circle

- BI – Dropping \perp from centre of circle to BC.










- BI – For described circle.










	<p>(iv) $h = 3.2\text{cm} \pm 0.1$</p> <p>② $A = \left(\frac{1}{2} \times 3.2 \times 6 \right) 2$ $= 19.2\text{cm}^2$</p> <p>(v) $R = 1.6\text{cm} \pm 0.1$</p>	<p>- M1</p> <p>- A1</p> <p>- A1</p>	
		10	
22.	<p>(a)</p>	<p>B4</p> <p>M1</p> <p>M1</p> <p>M1</p> <p>M1</p> <p>A1</p> <p>B1</p>	For each area✓

	<p>(b) Area =</p> $\frac{1}{2} \times 10 \times 50 + \frac{1}{2} \times 50 \times 250 + \frac{1}{2} \times 20 \times 50$ $+ \frac{1}{2} (10 + 20) 20 + \frac{1}{2} (40 + 10) 60 + \left(\frac{1}{2} \times 40 \times 130 \right)$ $\frac{1}{2} [500 + 1250 + 1000 + 600 + 3000 + 5200]$ $\frac{1}{2} \times 11550$ $= \frac{5775m^2}{10000}$ $= 0.5775 \text{ ha}$		
		10	
23.	<p>(a) (i) $88\% \equiv 4800$ $100\% \equiv ?$ $\frac{100}{88} \times 4800$ $= 5454.55$</p> <p>(ii) $145\% \equiv 4800$ $100\% \equiv ?$ $\frac{100}{145} \times 4800$ $= 3310.35$</p> <p>(b) %profit = $\frac{5454.55 - 3310.35}{3310.35} \times 100$ $= 64.77\%$</p> <p>(c) $100\% \equiv 3310.35$ $87.5\% \equiv ?$ $\frac{87.5}{100} \times 3310.35$ $= 2896.55$</p>	<p>M1 M1 A1 M1 A1 M1 M1 A1 M1 A1</p>	

		10	
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24.	<p>(a) $s = t^3 - 6t^2 + 9t + 5$</p> $\frac{ds}{dt} = 3t^2 - 12t + 9$ <p>at $t = 0.5$, $\frac{ds}{dt} = 3(0.5)^2 - 12(0.5) + 9$</p> $= 0.75 - 6 + 9$ $= 3.75 \text{ m/s}$ <p>(b) $3t^2 - 12t + 9 = 0$</p> $t^2 - 4t + 3 = 0$ $t^2 - t - 3t + 3 = 0$ $t(t-1) - 3(t-1) = 0$ $(t-3)(t-1) = 0$ $t-3 = 0 \quad \text{or} \quad t-1 = 0$ $t = 3 \quad \text{or} \quad t = 1$ <p>when $t = 3$</p> $s = t^3 - 6t^2 + 9t + 5$ $= (3)^3 - 6(3)^2 + 9(3) + 5$ $= 27 - 54 + 27 + 5$ $= 59 - 54$ $= 5 \text{ m}$ <p>When $t = 1$</p> $S = 1^3 - 6(1)^2 + 9(1) + 5$ $= 1 - 6 + 9 + 5$	<p>M1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>B1</p> <p>B1</p>	
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	$=9\text{m}$ (c) $s=t^3-6t^2+9t+5$ turning points (3, 5) and (1, 9)	B1													
	<table border="1"> <tr> <td>x</td><td>2</td><td>3</td><td>4</td></tr> <tr> <td>$\frac{ds}{dt}$</td><td>-3</td><td>0</td><td>9</td></tr> <tr> <td></td><td></td><td></td><td></td></tr> </table>	x	2	3	4	$\frac{ds}{dt}$	-3	0	9						
x	2	3	4												
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$\frac{ds}{dt}$	9	0	-3								
											
	<p>Sketch</p>										

		B3✓	For sketch
		10	