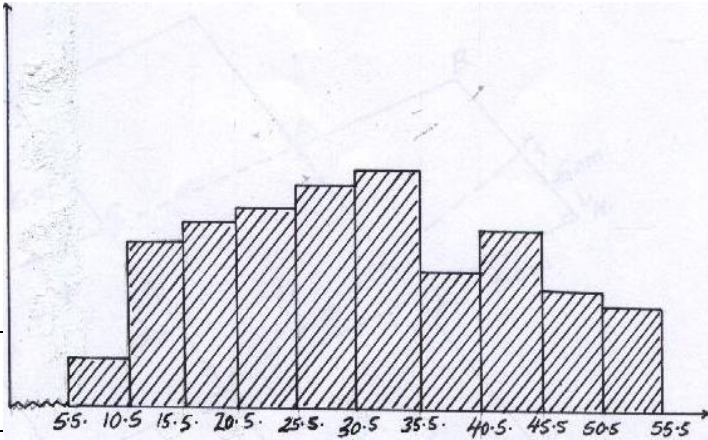


FORM 4

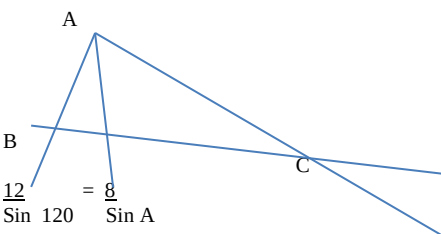
MATHS PAPER 1 (MS)

No	Working/ method	Marking Scheme
1.	No Log 3.172 0.5014 0.5014 $(0.008367)^2 \times 3.9226 \times 2$ $\frac{5.8452}{4.3466} +$ Log 9 $\bar{1}.9796 \bar{1}.9796 -$ $\bar{4}.3670$ $\bar{4}.3670 \div 5$ $\frac{5}{5} + \frac{1.3670}{5}$ $1.877 \times 10^{-1} = 0.1877$ $\bar{1}.2734$	M1 Addition of logs M1 subtraction of logs M1 Division of logs A1
		04
2.	$3^{2x-y} = 3^3$ $4^x \div 4^{2y} = 4^0$ $2x - y = 3$ $x - 2y = 0$ $2(2y) - y = 3$ $4y - y = 3$ $3y = 3$ $y = 3$ $x = 2y$ $= 2$	M1 both equation M1 A1
		03
3.	Numerator $\frac{3}{4} + \frac{2}{5} \div \left(\frac{3}{5} \times \frac{5}{3} \right)$ $\frac{3}{4} + \frac{2}{5} = \frac{23}{20}$ Denominator $\frac{7}{4} - \frac{5}{8} = \frac{9}{8}$ $\frac{23}{20} \div \frac{9}{8} = \frac{23}{20} \times \frac{8}{9}$ $= \frac{46}{45}$ or $1\frac{1}{45}$	M1 M1 M1 A1
		04
4.	$\tan 75.97^\circ = m$ $\tan 76^\circ = m$ $m = 4.0108$ $m \approx 4$ $y = 4x + 8$ $0 = 4x + 8$ $4x = -8$ $x = -2$ Coordinate are (-2,0)	B1 M1 A1
		03
5.	$3x - 2 < 10 + x$ $2x < 12$ $3x - 2 < 10$ $x < 6$ $10 + x < 2 + 5x$ $-4x < -8$ $x > 2$ $2 < x < 6$	B1 B1

	$100x = 73.333 - (\text{iii})$ Subtracted (ii) from (iii) $100x = 73.333 -$ $10x = 7.333$ $90x = 66$ $x = \frac{66}{90}$ $x = \frac{11}{15}$	M1 M1 A1					
		03					
13.	$S.A = \frac{1}{2} (4 \pi r^2) = 2 \pi r^2$ $\therefore 509 = 2\pi r^2$ $R = \sqrt{\frac{509}{2 \times 3.142}}$ $R = 9.00 \text{ cm}$ $\text{Internal radius, } r = 9.000 - 1.5$ $= 7.5 \text{ cm}$ $\text{Volume of the bowl} = \frac{1}{2} \times \frac{4}{3}\pi r^3$ $= \frac{1}{2} \times \frac{4}{3} \times 3.142 \times 7.5^3$ $= 883.7 \text{ cm}^3$	M1 M1 A1					
		03					
14.	$\angle MNO = \angle NML = 54^\circ$ $\angle PNM = 180^\circ - 54^\circ = 126^\circ$ $\angle NPM = \angle NMP = 180 - 126$ $= 27^\circ$ (Base $\angle$ s of isosceles Δ) $\angle PML = 54^\circ - 27^\circ$ Hence $\angle LPM = 180^\circ - (27^\circ + 50^\circ)$ $= 103^\circ$	B1 M1 A1					
		03					
15.	$\angle ACB = 90^\circ$ hence ΔABC is right angled triangle $\therefore (2x)^2 + x^2 = 8^2$ $4 x^2 + x^2 = 64$ $5x^2 = 64$ $x = \sqrt{12.8}$ $x = 3.578 \text{ cm}$ $AC = 2x = 2 \times 3.578$ $= 7.156$	B1 B1 B1					
		03					
16.	$2/0.728 + 0.5/13.95$ $2/7.268 \times 10^{-1} + 0.5/1.395 \times 10^{-1}$ $2 (0.1376) \times 10 + 0.5 (0.7168) \times 10^{-1}$ $2.752 + 0.03584$ 2.7878 2.79	M1 for correct square and square root M1 B1 A1					
		04					
17	(i) Table <table><tr><td>Class</td><td>x</td><td>f</td><td>fx</td><td>cf</td></tr></table>	Class	x	f	fx	cf	B1 B1 Column of x B1 Column of (fx)
Class	x	f	fx	cf			

	<table><tr><td>6-10</td><td>8</td><td>5</td><td>40</td><td>5</td></tr><tr><td>11-15</td><td>13</td><td>19</td><td>247</td><td>24</td></tr><tr><td>16-20</td><td>18</td><td>21</td><td>378</td><td>45</td></tr><tr><td>21-25</td><td>23</td><td>23</td><td>529</td><td>68</td></tr><tr><td>26-30</td><td>28</td><td>25</td><td>700</td><td>95</td></tr><tr><td>31-35</td><td>33</td><td>27</td><td>891</td><td>120</td></tr><tr><td>36-40</td><td>38</td><td>20</td><td>760</td><td>140</td></tr><tr><td>41-45</td><td>43</td><td>25</td><td>1075</td><td>165</td></tr><tr><td>46-50</td><td>48</td><td>13</td><td>624</td><td>178</td></tr><tr><td>51-55</td><td>53</td><td>12</td><td>636</td><td>190</td></tr><tr><td></td><td></td><td>190</td><td>5880</td><td></td></tr></table>	6-10	8	5	40	5	11-15	13	19	247	24	16-20	18	21	378	45	21-25	23	23	529	68	26-30	28	25	700	95	31-35	33	27	891	120	36-40	38	20	760	140	41-45	43	25	1075	165	46-50	48	13	624	178	51-55	53	12	636	190			190	5880		B1 Column for CF M1 M1 A1 M1 A1
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	Median item $\frac{N}{2} = \frac{190}{2} = 95$ $Median = 30.5 + \frac{95 - 93}{27} \times 5$ $= 30.87$ (ii) Mean $= \frac{5880}{190}$ $= 30.95$ (iii) Histogram 	B1 for correct class boundaries B1 for correct bars B1 for correct polygon																																																							
18	a) $\tan \theta = \frac{15}{20} = 0.75$ $\theta = 36.87^\circ$; $\angle CAD = 36.87 \times 2$ $= 73.74^\circ$ Area of sector ACD $= \frac{73.74}{360} \times \frac{22}{7} \times 20 \times 20$ $= 257.50 \text{ cm}^2$ b) $\angle CBD = 180 - 73.74$ $= 106.26^\circ$ Area of sector BCD $= \frac{106.26}{360} \times \frac{22}{7} \times 15 \times 15$ $= 208.725 \text{ cm}^2 \approx 208.73 \text{ cm}^2$ c) $\sin 36.87^\circ = \frac{x}{20}$ $x = 12$	10 B1 M1 A1 B1 M1 A1 M1 A1																																																							

	$\therefore CD = 12 \times 2$ $= 24 \text{ cm}$ d) Area A quadrilateral ACBD $= \frac{1}{2} \times 20 \times 20 \sin 73.74^\circ + \frac{1}{2} \times 15 \times 15 \sin 106.26^\circ$ $= 192 + 108$ $= 300 \text{ cm}^2$ e) $(25.75 - 0 - 192) + (208.725 - 108)$ $= 65.5 + 100.725$ $= 166.225 \text{ cm}^2$	B1 <u>B1</u>
		10
19.	a) i) $\frac{12000}{x}$ ii) $\frac{14000}{x-5}$ $\frac{12000}{x-5} + 100$ b) $\frac{14000}{x-5} - \frac{12000}{x} = 100$ $14000x - 12000x + 60,000 = 100x(x-5)$ $x^2 - 25x - 600 = 0$ $x = \frac{25 \pm \sqrt{625 + 2400}}{2}$ $= \frac{25 \pm 55}{2}$ $x = \frac{25 + 55}{2} = 80$ c) $\frac{1200}{40} = \text{Sh}300$ d) i) No. of people = $40 - 5 = 35$ Combustion = $\frac{14000}{35}$ $= \text{Sh} 400$ ii) $300: 400 = 3:4$	B1 B1 B1 M1 M1 A1 B1 M1 A1 B1
20.	a) $t = \frac{300}{80}$ $= 3\text{hrs } 45 \text{ min}$ Arv. Time = $7.00 + 3\text{hrs } 45\text{min}$ $= 10.45 \text{ a.m}$ b) R.S = $120 + 80 = 200 \text{ km/hr}$ Dist. Separating them at 7.45am $= 300 - \frac{45 \times 80}{100} = 240$ $t = \frac{240}{200}$ $= 1\text{hr } 12\text{m}$ Meeting time = $7.45 + 1\text{hr } 12\text{min}$ $= 8.57 \text{ a.m}$ c) $D = \frac{240 \times 80}{200} + \frac{45 \times 80}{60}$ $= 156 \text{ km}$ d) Arr. Time for car $= 7.45 + \frac{300}{200}$	10 M1 A1 M1 M1 M1 A1 M1 A1

	$D = \frac{\frac{120}{10.15a.m} - \frac{10.15}{60}}{80}$ $= 40 \text{ km}$	M1 A1 10
21.	A Det = $45 - 42 = 3$ $a^{-1} = \frac{1}{3} \begin{pmatrix} 9 & -6 \\ -7 & 5 \end{pmatrix}$ Type equation here. bi) $\begin{pmatrix} 5 & 6 \\ 7 & 9 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 2440 \\ 3561 \end{pmatrix}$ ii. $\begin{pmatrix} 3 & -2 \\ 7/3 & 5/3 \end{pmatrix} \begin{pmatrix} 5 & 6 \\ 7 & 9 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3 & -2 \\ -7/3 & 5/3 \end{pmatrix} \begin{pmatrix} 2440 \\ 3560 \end{pmatrix}$ $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 2 \times 2440 - 2 \times 3560 \\ \frac{7}{3} \times 2440 - \frac{5}{3} \times 3560 \end{pmatrix}$ $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 200 \\ 240 \end{pmatrix} = x = 200$ $Y = 240$ c. Total = $36 \times 200 + 50 \times 240$ Cost of book = 19200 Total cost with discount $= \frac{36 \times 200 \times 95}{100} + \frac{50 \times 240 \times 92}{100} = 17,800$ % discount = $\frac{1320 \times 100}{19200} \%$ $= 6.875 \%$	
22.a	 $\frac{12}{\sin 120} = \frac{8}{\sin A}$ $\sin A = \frac{8 \sin 120}{12} = 0.5774$ $\angle A = 35.26$ $\angle C = 180 - (120 + 35.26) = 24.74$ $\frac{C}{\sin 27.74} = \frac{12}{\sin 120}$ $C = \frac{12 \sin 24.74}{\sin 120} = 5.798$ To 1 d.p = 5.8 bi. $\sin 24.74 = \frac{h}{12}$ $h = 12 \sin 24.74 = 5.02$	M1 B1 M1 A1

	D) $\frac{1}{2} \times (400) \times 200 = 30,000$ E) $\frac{1}{2} \times 300 \times 200 = 90,000$ F) $\frac{1}{2} \times (200 + 100) \times 600 = 90,000$ G) $\frac{1}{2} (100 + 300) \times 300 = 60,000$ H) $\frac{1}{2} \times (300 + 100) \times 600 = 120,000$ I) $\frac{1}{2} \times 100 \times 200 = 10,000$ Total = 622 500m² 1 ha = 10,000m² ? = 622500 622500 x 1ha 10,000 62.25ha	A1
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