

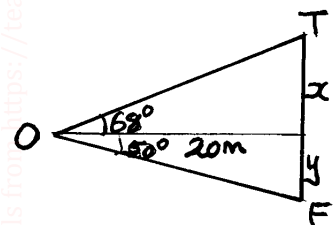
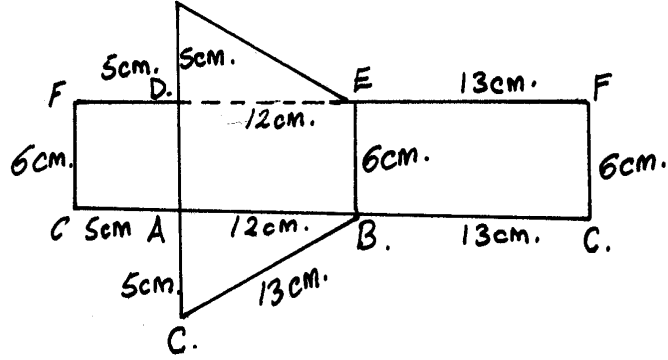
MATHEMATICS PAPER 1

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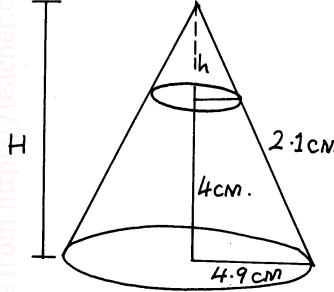
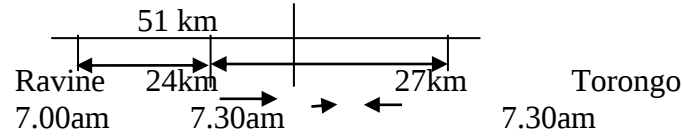
MARKING SCHEME

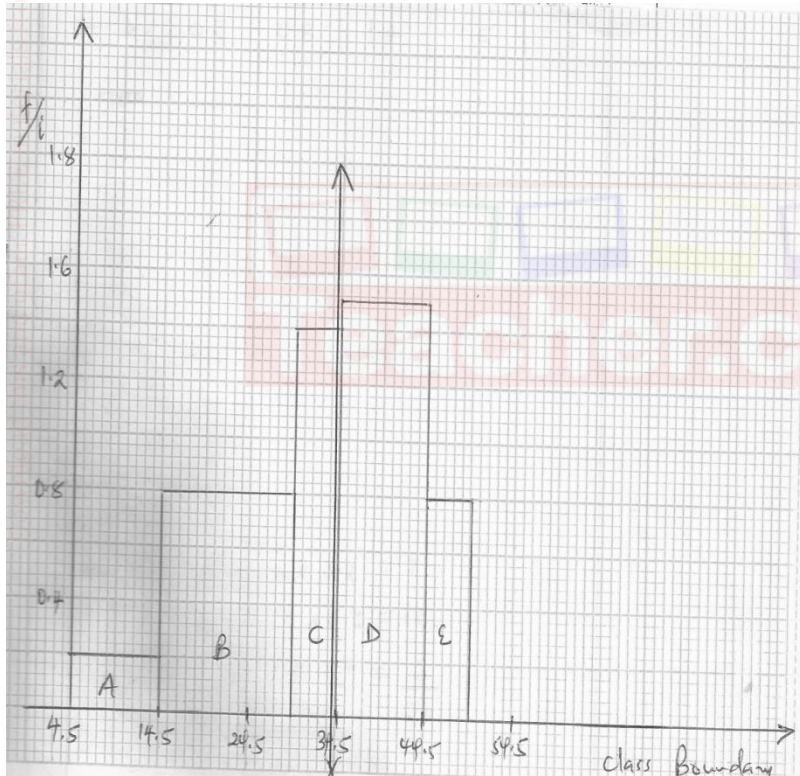
		Mks	Comment
1	$\frac{36-8 \times -4 -15 \div -3}{3 \times -3 + -8(+6 - (-2))}$ Numerator: $36 - 8 \times -4 + 5 = 36 + 32 + 5 = 73$ Denominator : $3 \times -3 + -8(8) = -9 - 64 = -73$ $\therefore N/D = 73 / -73 = -1$	M1 M1 A1	✓ Simplification of the num. ✓ Simplification of the den.
2	Other No. = $\frac{LCM \times G.C.D}{First\ No.}$ $= \left[\frac{240 \times 12}{60} \right]$ $= 48$	M1 A1	
3.	let her net salary be y rent = $\frac{1}{10}y$ plot = $\frac{1}{2}y - \frac{1}{10}y$ $= \frac{1}{2} \left(\frac{9}{10}y \right) = \frac{9}{20}y$ mother sh 2500 shopping sh. 7500 savings sh 12,500 $\frac{1}{10}y + \frac{9}{20}y + 2500 + 7500 + 12500 = y$ $\frac{1}{10}y + \frac{9}{20}y + 22500 = y$ $22500 = y - \frac{9}{20}y - \frac{6}{10}$ $22500 = \frac{20}{20}y - 9y - 2y$ $\frac{20}{9} \times 22500 = \frac{9y}{20} \times \frac{20}{9}$ $y = 22500 \times \frac{20}{9}$ $y = 50000$ down payment = $\frac{9}{20}y$ $= \frac{9}{20} \times 50,000 = sh\ 22,500$	M1 M1 M1 A1	
4.	£1200 to Ksh.= 1200×114.20 $= 137040$ Balance 600000 - 137040 = 462,960 Ksh.to Euros = <u>462960</u>	M1	

	101.30 $=4570.188$ $\text{Balance}=4570.188-200=4370.188$ $\text{Balance in Ksh.}=4370.188 \times 101.20$ $=\text{Ksh.}442,263$	M1 M1 A1	
5.	$a) x + \frac{1}{5}x = 180$ $x = 150$ $180 - 150 = 30$ $b) \frac{360}{30} = 12 \text{ sides}$	M1 A1 B1	
6	$\text{Reflex Angle AOC} = 360 - 138 = 222$ $\text{Angle ABC} = \frac{1}{2} \text{ AOC} = \frac{1}{2} \times 222 = 111$ $\text{Angle ADB} = 180 - (111 + 35) = 34$	B1 B1 B1	
7	 The height of the building = $x + y$ $\tan 68^\circ = \frac{x}{20}$ $x = 20 \tan 68^\circ = 49.50$ $\tan 50^\circ = \frac{y}{20}$ $y = 20 \tan 50^\circ = 23.835$ $\text{Hence } x + y = 49.50 + 23.835$ $= 73.336$ $= 73 \text{ metres}$	B1 B1 B1	
8	$\frac{(p+2m)(p-2m)}{2m-p \text{ } m-3p}$ $= \frac{-p+2m}{m-3p}$	B1 B1 B1	factors for numerator factors for denominator
9	SCALE: 1cm rep 5cm  Total S.A = $(30 \times 6) + (\frac{1}{2} \times 10 \times 12)$ $= 240 \text{ cm}^2$	B1 M1 A1	✓ sketch

10	$\frac{-5}{3}x \leq 11$ $x \geq \frac{-33}{5}$ $3 \leq \frac{-7}{4}x$ $\frac{-12}{7} \geq x$ $\frac{-12}{7} \geq x \geq \frac{-33}{5}$ $-6\frac{3}{5} \leq x \leq -1\frac{5}{7}$ Integral values -6, -5, -4, -3, -2,-	M1 A1 B1													
11	1L=1000Ml $5L = \frac{5L \times 1000L}{1L}$ =5000L $V.S.F = \frac{5000ml}{320ml} = \frac{125}{8}$ $\sqrt[3]{v.s.f} = L.S.F$ $= \sqrt[3]{\frac{125}{8}}$ $l.s.f = \frac{5}{2}$ $L.S.F^2 = A.S.F$ $= \frac{25}{4}$ $SMALLER BASE = \frac{4 \times 0.25}{25}$ =0.04 m² or 400 cm²	M1 M1 A1													
12.	$4^x(8^{x-1}) = 1$ $8^{x-1} = \frac{1}{4^x}$ $2^{3(x-1)} = \frac{1}{2^{2x}}$ $2^{3x-3} = 2^{-2x}$ $3x - 3 = -2x$ $x = \frac{3}{5}$	M1 M1 A1													
13	<table> <tr> <th>No</th> <th>log</th> </tr> <tr> <td>4.28</td> <td>0.6314</td> </tr> <tr> <td>0.01677</td> <td>2.2245</td> </tr> <tr> <td></td> <td>2.8559</td> </tr> <tr> <td>Tan 20°</td> <td>1.5611</td> </tr> <tr> <td></td> <td>1.2948</td> </tr> </table> = <u>0.1971</u>	No	log	4.28	0.6314	0.01677	2.2245		2.8559	Tan 20°	1.5611		1.2948	B1 B1 B1	√ logs √ +& - √ CAO
No	log														
4.28	0.6314														
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14	$\text{Volume} = \frac{22000}{5} \text{ cm}^3 \text{ -----}>$ $= 4400 \text{ cm}^3$ $4400 = \frac{4}{3} \pi r^2 \times 14$ $r^2 = \frac{4400 \times 3}{4 \times 14} = 100$ $\therefore r = 10 \text{ cm}$	M1 M1 A1	exp to obtain volume exp to obtain radius
15	$\sqrt{\frac{1}{2.456 \times 10^1} + 4.346^2}$ $\sqrt{10^{-1}(0.4072) + 18.88}$ $\sqrt{18.92872}$ 4.3509 $= 4.351 \text{ (4 significant figure)}$	M1 M1 M1 A1	Correct reciprocal square Correct square root Correct significant figures
16	$y = (a + b)(x - c)^2$ $y = (5 + 6)(-3 - 2)^2$ $y = (11)(-5)^2$ $= 11 \times 25$ $= 275$	M1 M1 A1	Correct substitution
17.	Section II (50 MARKS) <i>Co-ordinates of R (x, o)</i> $3y - 2x = -2$ $3(0) - 2x = -2$ $x - 1$ <i>coordinates (1,0)</i>	3 marks	
	$3y - 2x = -2$ $y = \frac{2}{3}x - \frac{2}{3}$ $gr.l1 = \frac{2}{3}$ $gr.l2 = -\frac{3}{2}$ $gr = \frac{y - 0}{x - 1}$ $2y = -3x + 3$ $y = -\frac{3}{2}x + \frac{3}{2}$	3 marks	
	$gr.l3 = \frac{2}{3}$ $gr = \frac{y - 1}{x - -4} = \frac{2}{3}$ $3y - = 2x + 8$	2 marks	

	$3y = 2x + 11$ $y = \frac{2}{3}x + \frac{11}{3}$		
	$l3 = \left(y = \frac{2}{3}x + \frac{11}{3}\right) 6$ $l2 = y = -\frac{3}{2}x + \frac{3}{2}$ $6y - 4x = 22$ $6y + 9x = 9$ $-13x = 13$ $x = -1$	3 marks	
18. a)	 $\frac{4+h}{h} = \frac{4.9}{2.1}$ $4.9h = 3.4 + 2.1h$ $2.8h = 3.4$ $h = 3\text{cm}$ $H = 3 + 4 = 7\text{cm}$	M1 A1	
b)	Surface area $(\pi RL - \pi rl) + \pi r^2 + 2\pi R^2$ $L^2 = 4.9^2 + 7^2$ $= 24.01 + 49 = 73.01$ $L = 8.54\text{cm}$ $l^2 = 2.1^2 + 3^2 = 4.41 + 9 = 13.41$ $l = 3.66\text{cm}$	M1 M1 M1 A1	
c	$3.142(14.9 \times 8.54) - (2.1 \times 3.66) + 2.1^2 + (2 \times 4.9^2)$ $3.142(41.846 - 7.686 + 4.41 + 48.02)$ $= 3.142 \times 86.59 = 272.07\text{cm}^2$	M1 M1 M1 A1	
19. a)	 Distance = $51 - \left(\frac{1}{2} \times 48\right)$ $= 27\text{ km}$ A . speed = $48 + 60 = 108\text{ kmh}^{-1}$ Time = $\frac{27}{108} \times 60\text{ min} = 15\text{ min}$ $\Rightarrow 7.45\text{ am}$	M1 M1 M1 A1 M1	Obtaining distance Obtaining speed Exp for time Exact time given Exp for tot dist

	b) from Ravine = 24 + $\left(\frac{15}{60} \times 48\right)$-----> = 36 km -----> c) Time $\left(\frac{36}{60} \times 60\right)$ min = 36min Travelling time = 36 – 15 -----> 21 min -----> Distance = 15 km Speed = 15 ÷ $\frac{21}{60}$ -----> = 42$\frac{6}{7}$ kmh⁻¹	A1 M1 M1 M1 A1													
20	a) 2+12+7+15+x=40 x = 4 b) <table border="1"><tr><td>CB</td><td>4.5 – 14.5</td><td>14.5 – 29.5</td><td>29.5 – 34.5</td><td>34.5 – 44.5</td><td>44.5 – 49.5</td></tr><tr><td>Fd</td><td>0.2</td><td>0.8</td><td>1.4</td><td>1.5</td><td>0.8</td></tr></table> 	CB	4.5 – 14.5	14.5 – 29.5	29.5 – 34.5	34.5 – 44.5	44.5 – 49.5	Fd	0.2	0.8	1.4	1.5	0.8		
CB	4.5 – 14.5	14.5 – 29.5	29.5 – 34.5	34.5 – 44.5	44.5 – 49.5										
Fd	0.2	0.8	1.4	1.5	0.8										
	Total area A = 10 x 0.2 = 2 B = 15 x 0.8 = 12 C = 1.4 x y = $\frac{6}{20}$ y = $\frac{6}{1.4}$ = 4.286 $\frac{6}{1.4} \times 5 = 2d = \frac{4.286}{5}$ Line drawn between 4th & 5th square Value = 29.5 + 4.3 = 33.8														
20.	$sh. \frac{1200}{x}$	1 mark													
	$\frac{1200}{x} + 10$	2 mark													

	$\frac{1400}{x-5}$	s	
	$\frac{1400}{x-5} - \frac{1200}{x} = 10$ $\frac{1400x - 1200(x-5)}{x(x-5)} = 10$ $x^2 - 25x - 600 = 0$ $(x-40)(x+15) = 0$ $x = 40 \text{ or } -15$ $40 - 5 = 35 \text{ made contribution}$	5 marks	
	$\frac{1400}{35} = sh 40$	2 marks	
22	a) position of plane P = $300 \times \frac{8}{3} = 800\text{km}$ (8cm) Position of plane Q = $240 \times \frac{13}{6} = 520 \text{ km}$ (5.2cm) Position of plane R = $400 \times \frac{3}{2} = 600\text{km}$ (6cm) b) $QR = 10.7\text{cm} \pm 0.1$ $= (10.7 \times 100) \text{ km}$ $= 1070\text{km}.$ c) Bearing of Q from P $093^\circ \pm 1^\circ$ d) Bearing of R from Q $228^\circ \pm 1^\circ$	B1 B1 B1 B1 B1 B1 M1 A1 B1 B1	locating p ✓ locating Q ✓ locating R ✓
23.	$GL \sqrt{30^2 + 9^2}$ $\sqrt{981}$ $= 31.32 \text{ CM}$	1 MARK	
	$HF = \sqrt{40^2 + 92}$ $\sqrt{1681}$ $HF = 41$	2 marks	

	$FJ = \sqrt{30^2 + 41^2}$ $\sqrt{2581}$ $= 50.8035$		
	$HF = EG = 41 \text{ CM}$ $\text{TAN } \phi = \frac{30}{41}$ $\text{TAN}^{-1}\phi = 36.19^\circ$	3 MARKS	
	$\text{TAN } \alpha = \frac{30}{40}$ $\text{TAN}^{-1} \alpha = 36.87^\circ$	2 MARKS	
	$\text{TAN } \beta = \frac{30}{9}$ $\text{TAN}^{-1}\beta = 73.3$	2 MARKS	

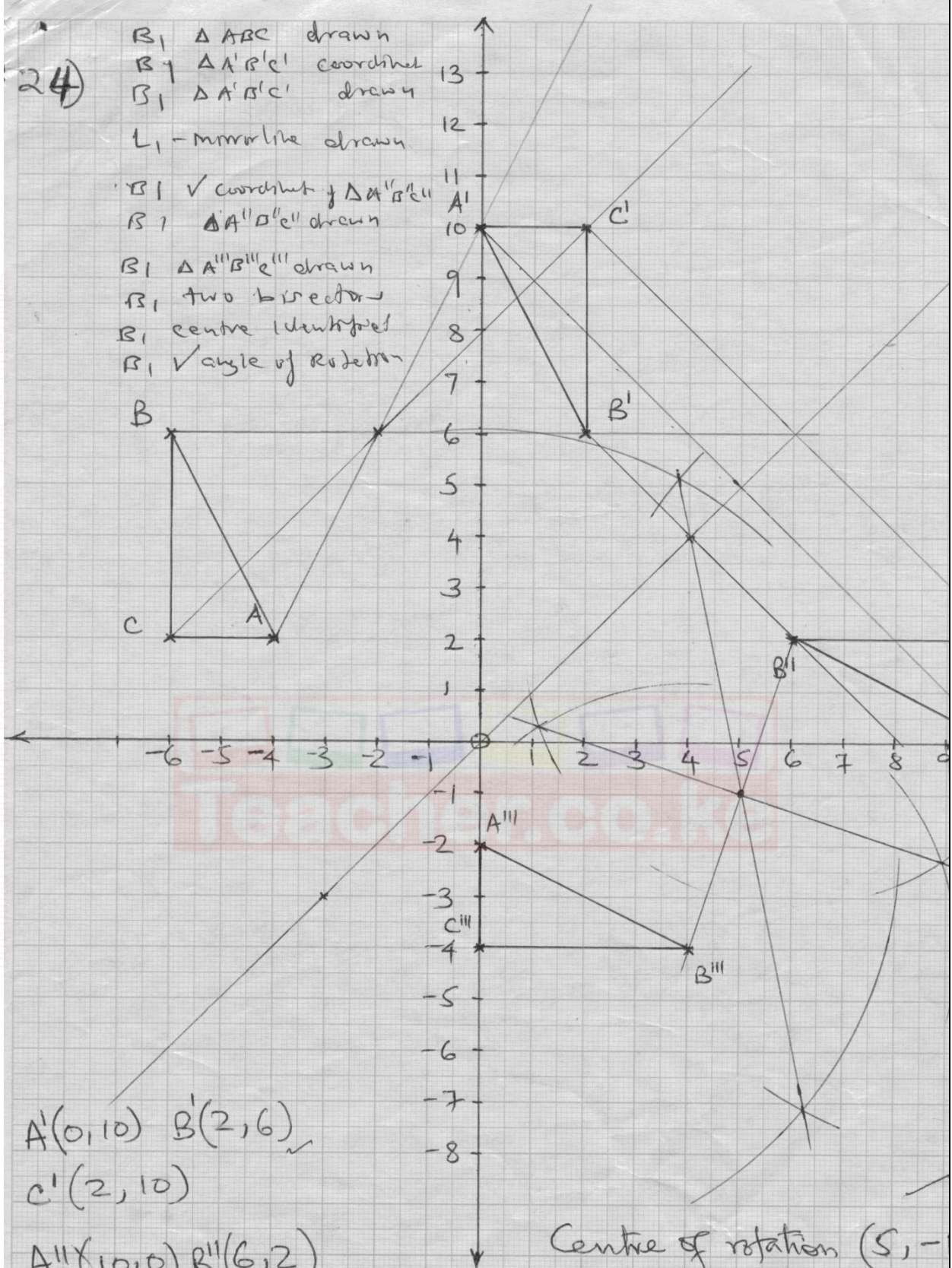


24)

B₁ ΔABC drawn
 B₁ $\Delta A'B'C'$ coordinates
 B₁ $\Delta A'B'C'$ drawn
 L₁ - mirror line drawn

B₁ $\checkmark$ coordinates of $\Delta A''B''C''$
 B₁ $\Delta A''B''C''$ drawn

B₁ $\Delta A'''B'''C'''$ drawn
 B₁ two bisectors
 B₁ centre identified
 B₁ $\checkmark$ angle of rotation



$A'(0, 10)$ $B'(2, 6)$
 $C'(2, 10)$

$A''(10, 0)$ $B''(6, 2)$
 $C''(10, 2)$

Centre of rotation (5, -7)
 Angle of rotation $\pm 180^\circ$