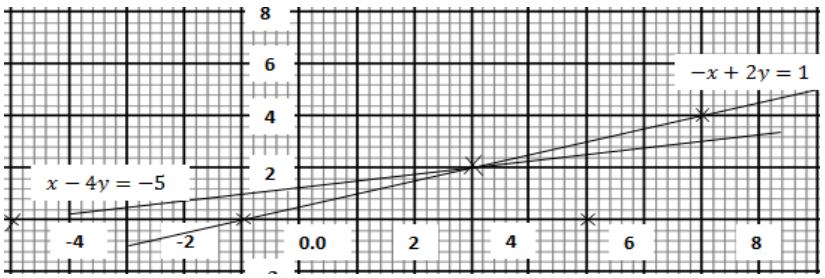
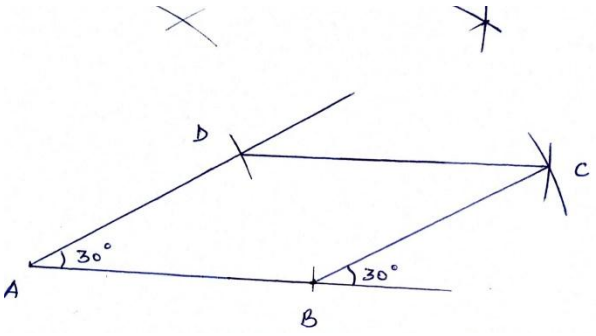
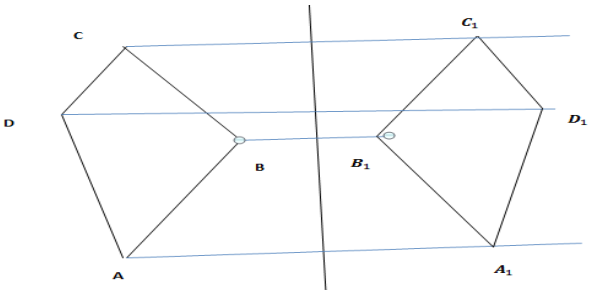
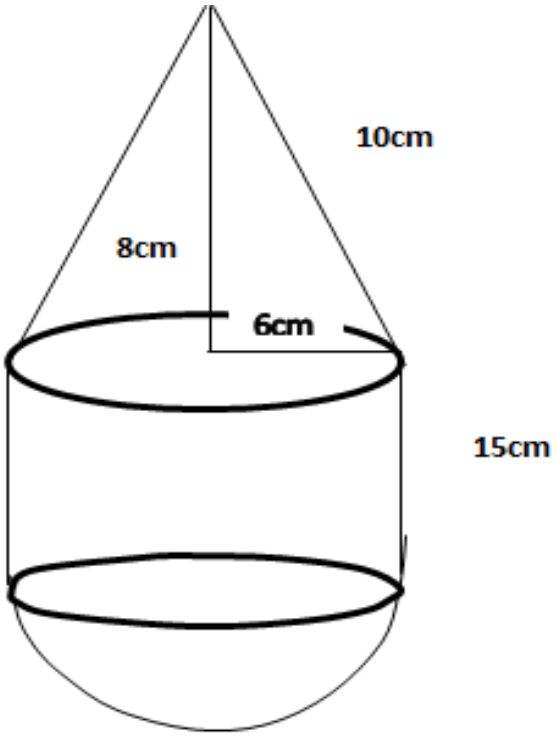
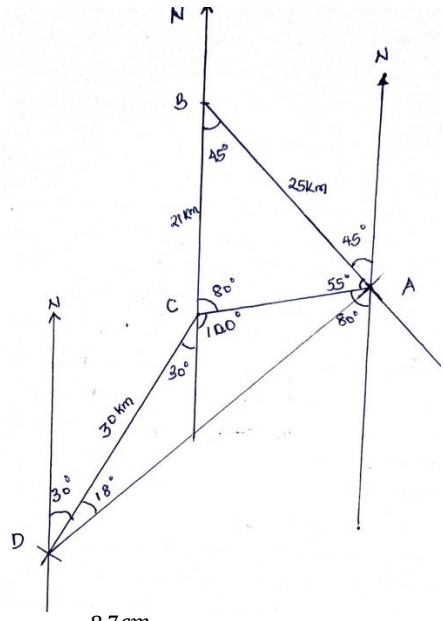
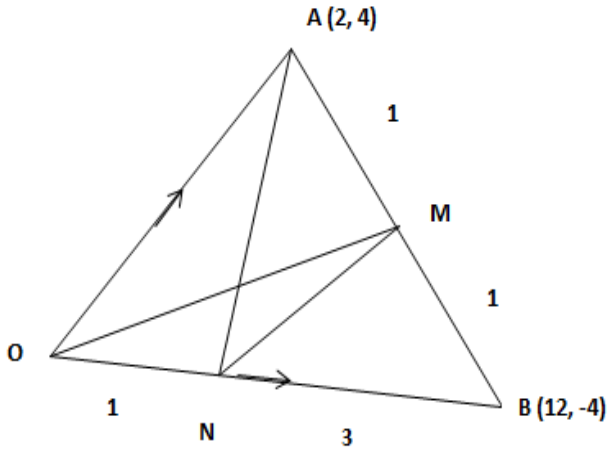
Math 2020 p1 ms_alt A

Q	Content	Marks
1	$\frac{-\mathbf{3}(6-2)--12\div 4+5}{\mathbf{-4\,x-6\pm 3\,5}}$ $\frac{-3(4)+3+5}{24\pm 15}$ $\frac{-4}{9}$	
2	$r=5.5\dot{5}$ $10r=55.5\dot{5}$ $9r=50$ $r=5\frac{5}{9}$	
3	$7^{2(\frac{3}{2})}x\,(\frac{2^3}{7^4})^{\frac{3}{4}}$ $=\frac{7^3x\,2^6}{7^3}$ $=2^6$ =64	
4	42= 2x3x7 54= $2x3^3$ Gc.d. = 2x3=6 $\therefore \text{gcd}\,of\ 5.4\ and\ 4.2=0.6$ No or tiles=$\frac{area\ room}{area\ \ tile}$ =$\frac{5.4x4.2}{0.6x0.6}$ =63 tiles	
5	$\frac{2x^2-xy-6y^2}{x^2-4xy+4y^2}$ $\frac{2x^2-4xy+3xy-6y^2}{x^2-2xy-2xy+4y^2}$ $\frac{(2x+3y)\cancel{(x-2y)}}{(x-2y)\cancel{(x-2y)}}$ =$\frac{(2x+3y)}{(x-2y)}$	
6	$m_1=-\frac{1}{2}$ $m_2=2\quad(2,-1)$ $y=m(x-x\ value)+y\ value$ $y=2(x-2)-1$ $y=2x-5$	
7	$(n-2)180=1260$ $n=9\ sides$ $ext\ \measuredangle=\frac{360}{9}$ =40	
8	$x-4y=-5$ $-x+2y=1$	

	x-4y = -5 	X	-5	3
y	0	2 | -x + 2y = 1 | X	-1	7
y	0	4	  X=3 and y=2	
9	Sin (θ+30)= cos 2θ θ+30+2θ=90 θ=20 $\therefore \cos 60 = 0.5$	
10	$\theta=60^0=\pi/3$ radians Arc length=θr where θ is in radians $=\frac{\pi}{3}xr + \frac{\pi}{3}x(r+7) + 7 + 7 = 28\frac{2}{3}$ $\frac{2\pi}{3}r = 14\frac{2}{3} - \frac{7\pi}{3}$ $r = 3.502$	
11	 	
12	1dollar=sh 102.40 200000 dollars=? $\frac{200000\cancel{dollars}}{1\ \cancel{dollar}}\ x\ ksh\ 102.40$ =ksh 20 480 000 $100\ Jap\ yen = ksh 93.30$ $?= 0.9(20480000)$ $=\frac{0.9(20480000)}{93.3}$ x 100 yen =19 755 627.01 $\approx$ 19 755 627	

13	$\theta = \pi/3$ $\theta_2 = 2\pi - \frac{\pi}{3}$ $=1\frac{2}{3}\pi$ $area = \frac{1}{2}\theta r^2$ where θ is in radians $=\frac{1}{2}x\frac{5}{3}\pi\ x\ 7\ x7$ $=128.28cm^2$	$\theta = 360 - 60 = 300$ $arc\ length, b = \frac{\theta}{360}.2\pi r$ $chord = radius = 7\ cm$ $b = \frac{300}{360}x\ 2\ x\frac{22}{7}x\ 7$ $= 36\frac{2}{3}$ cm $area = \frac{1}{2}b.r$ $= \frac{1}{2}\ x\ 36\frac{2}{3}\ x\ 7$ $= 128\frac{1}{3}\ cm^2$ $\approx 128.33\ cm^2$	
14	$2 + 6.4\tan 30$ $= 5.695$ $\approx 5.7\ m$		
15	$hr \quad min \quad s$ 1 35 31 0 0 45 0 0 43 0 0 44 +0 0 45 1 38 28 = 1. 38 28 pm		
16	a)  b) Indirect congruent or opposite congruency		
17	a) i. $Ko: \quad Ki \quad Al$ $0.2: \quad 0.3: \quad 0.5$ $Ki = 30\ \%\ of\ 1\ 750000$ =ksh. 525000 ii. 2:3:5 b) $A = PR^n$ where R = 1+r $= 1750000(1.08^3)$ =2204496 Shared amount=90% x2204496 =1984046.4 Kosgei=0.2 x1984046.4 =sh. 396809 Kimani=0.3(1984046.4 = sh. 595214 Atieno=0.5 x1984046.4 =sh. 992023		

18.	a)  Total height =8+15+6 =29 cm b) SA= $\pi rl + 2\pi r^2 + 2\pi rh$ $= 3.142x\ 6x10 + 2x3.142x6^2 + 2x3.142x6x15$ =188.52+565.56+226.224 $= 980.304$ $\approx 980.3\ sq.cm$ c) V=$\frac{1}{3}xAh + \pi r^2 h + \frac{2}{3}\pi r^3$ $= \frac{1}{3}x\ 3.142x36x8 + 3.142x36x15 + \frac{2}{3}x\ 3.142x\ 216$ =2450.76 cubic cm $\approx$2450.8cm^3	
19	a) (i) $lorry\ time = \frac{180km}{x} hrs$ $pick\ up\ time = \frac{180km}{x+20} hrs$ (ii) $\frac{180km}{x} - \frac{180km}{x+20} = \frac{3}{4}$ $x^2 + 20x - 4800 = 0$ $(x-60)(x+80) = 0$ $x = 60km/h\ or\ -80km/h$ $\therefore x = 60\ km/h$ hence $lorry = 60\ km/h$ & $pick\ up = 80\ km/h$ b) $distance\ \ pick\ up + distance\ lorry = 240\ km$ $80(t - 8.30\ am) + 60\ (t - 8.30\ am) = 240$ where t meeting time $140\ t - 680 - 510 = 240$ $t \approx 10\ 13\ hrs$	

20	a.  b. (i) AD=$\frac{8.7cm}{1cm}x5\ km$ $= 43.5\ km \pm 0.5$ (ii) $bearing\ of\ A\ from\ D\ is\ 048^0\ or\ N48^0E$ c. $A_{\Delta ABC} = \frac{1}{2}x21\ x\ 25 \sin 45^0$ $= 185.62\ km^2$ $A_{\Delta ACD} = \frac{1}{2}\ x\ 30\ x43.5 \sin 18^0$ $= 201.63km^2$ $total\ area = 185.62 + 201.63$ $= 387.25km^2$ $\approx 387.3\ km^2$	
21	a)  (i) AB= $\begin{pmatrix}-2\\-4\end{pmatrix} + \begin{pmatrix}12\\-4\end{pmatrix} = \begin{pmatrix}10\\-8\end{pmatrix}$	

(ii) NM = $-\frac{1}{4}\begin{pmatrix}12\\-4\end{pmatrix}+\frac{1}{2}\begin{pmatrix}2\\4\end{pmatrix}+\frac{1}{2}\begin{pmatrix}12\\-4\end{pmatrix}$

$=\begin{pmatrix}-3\\1\end{pmatrix}+\begin{pmatrix}1\\2\end{pmatrix}+\begin{pmatrix}1\\2\end{pmatrix}$

$=\begin{pmatrix}4\\1\end{pmatrix}$

(iii)$|NM| = \sqrt{a^2+b^2}$

$=\sqrt{4^2+1^2}$

$=\sqrt{17}$

$= 4.123$

≈ 4.1

b) T=$A^{-1}-A$

$\begin{pmatrix}5\\-1\end{pmatrix}-\begin{pmatrix}2\\4\end{pmatrix}=\begin{pmatrix}3\\-5\end{pmatrix}$

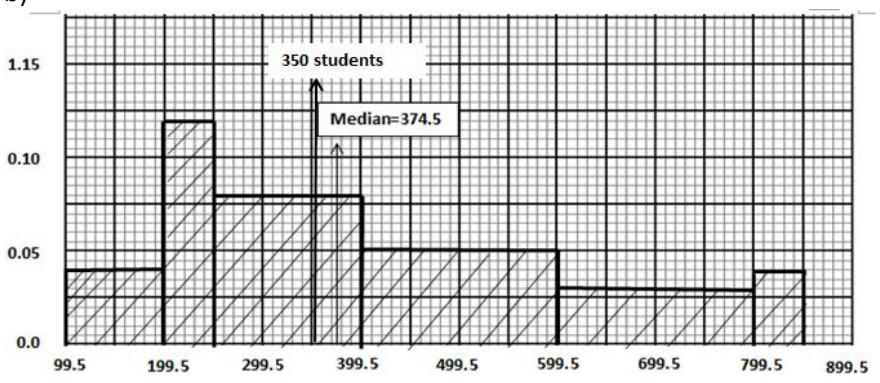
$\begin{pmatrix}3\\-5\end{pmatrix}+\begin{pmatrix}12\\-4\end{pmatrix}=\begin{pmatrix}15\\-9\end{pmatrix}$

$\therefore B^1(15,-9)$

22 a)

class	tally	f	fd	cf
100-199	IIII	4	0.04	4
200-249	~~IIII~~ I	6	0.12	10
250-399	~~IIII~~ ~~IIII~~ II	12	0.08	22
400-599	~~IIII~~ ~~IIII~~	10	0.05	32
600-799	~~IIII~~ I	6	0.03	38
800-849	II	2	0.04	40

b)



c) (i) Median psn=40/2 =20th value

$=10+x\ X\ 0.08=20$

$x=125$

Median=125+249.5

=374.5

(ii) $49.5\ x\ 0.08+10+6+2$

$=21.96$

$\approx 22\ schools$

23	a. $3-\left\{p\,(p-\frac{1}{2})\right\}=0$ $3-p^2+\frac{1}{2}p=0$ $2p^2-p-6=0$ $(p-2)(2p+3)=0$ $p=2\ or\ -1.5$ b. (i) $x+30\,y=70000\ldots(i)$ $1.2\,x+40y=88000\ldots(ii)$ $6x+200y=440000$...(ii) (ii) $\begin{pmatrix}1\,,30\\6,200\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}70000\\440000\end{pmatrix}$ $\begin{pmatrix}1,0\\0,1\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}10&-1.5\\-0.3&0.05\end{pmatrix}\begin{pmatrix}70000\\440000\end{pmatrix}$ $\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}40000\\1000\end{pmatrix}$ $\therefore x=40000\ and\ y=1000$	
24	a) V=$2t^2-7t-6\ if\ t=5$ =$2t^2$-7t-6 =9 m/s b) V=$2t^2$-7t-6 =0 $t=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ $=\frac{7\pm\sqrt{7^2+4x2x6}}{2x2}$ =4.212 s or -0.7122 s $\therefore t=4.212\ s$ c) S=$\frac{2}{3}t^3-\frac{7}{2}t^2-6t+8\ if\ t=4.212$ S=$\frac{2}{3}t^3$-$\frac{7}{2}t^2$-6t + 8 =-37.5487 m d) $a=\frac{dv}{dt}=4t-7\ if\ t=4$ =4 x 4 -7 =$9m/s^2$	