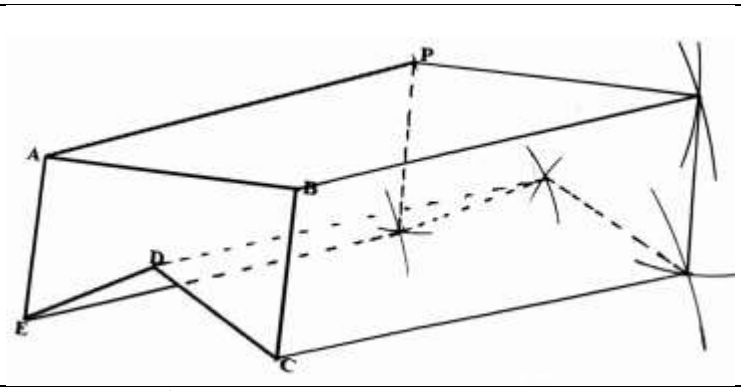
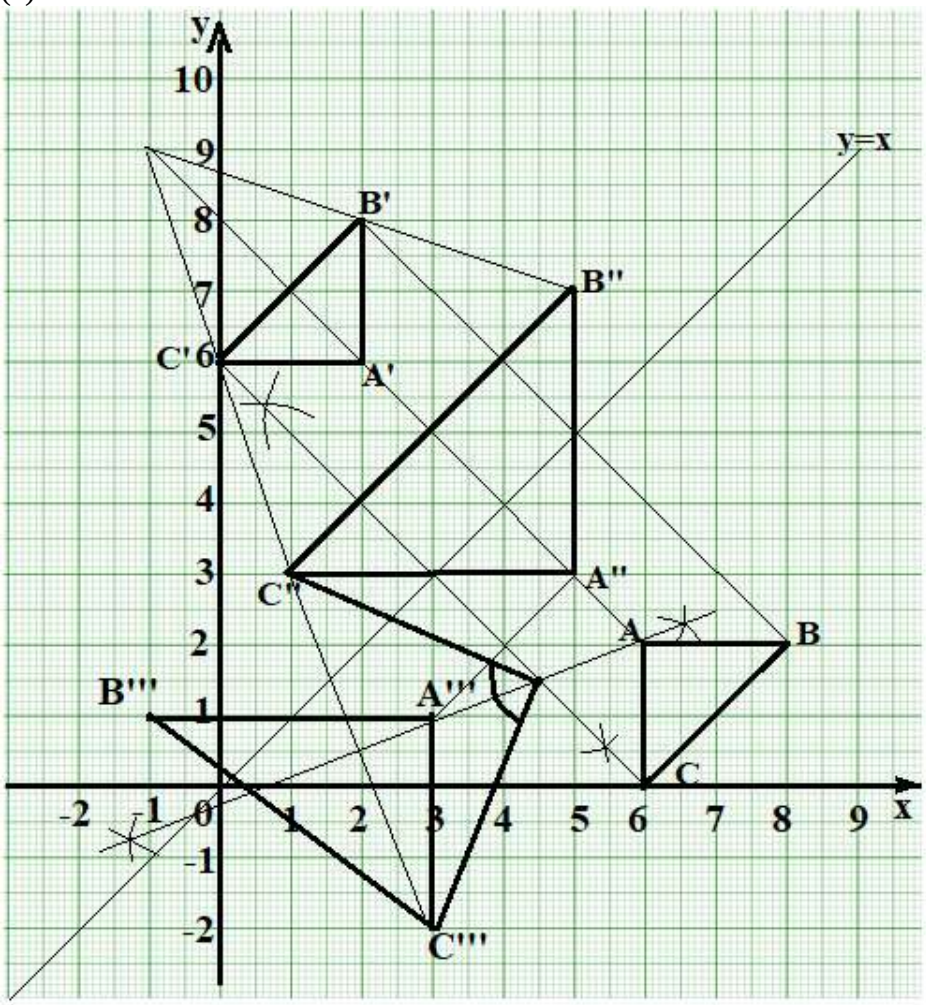
KAPSABET HIGH SCHOOL

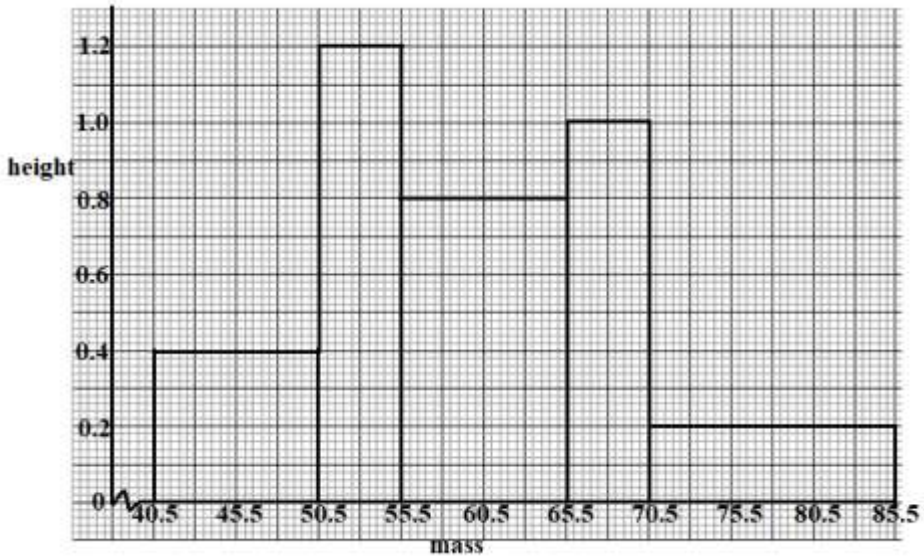
1	$\frac{-4\{(-4-5)-3-2\}}{-12+8}$ ✓ $\frac{-4\times-14}{-4}$ ✓ $=-4$ ✓	M1 M1 A1
2	$\frac{2(3x^2y^2-10xy+8)}{2(x^2y^2-4)}$ ✓ $\frac{2(3xy-4)(xy-2)}{2(xy+2)(xy-2)}$ ✓ $\frac{3xy-4}{xy+2}$ ✓	M1 M1 A1
3	$\frac{4}{5}-\frac{3}{4}$ ✓ $=\frac{1}{20}$ ✓	M1 A1
4	$let\ centre\ be\ (x,y)$ $\frac{3-x}{3-x}=\frac{7-x}{1-x}$ ✓ $x=3$ $\frac{7-y}{1-y}=\frac{5-y}{2-y}$ $y=3$ ✓ $\therefore centre(3,3)$ ✓ $S.F.=\frac{7-3}{1-3}=\frac{4}{-2}=-2$ ✓	M1 M1 A1 B1
5	$x-\frac{3}{2}\leq 2x+1$ $x\geq-\frac{5}{6}$ ✓ $2x+1<5$ $x<2$ $-\frac{5}{6}\leq x<2$ ✓ $integral\ values=0,1$ ✓	M1 A1 B1

6	$time\ taken\ to\ catch\ up = 10.45 - 9.00 = 1.45 = 1\frac{3}{4}h$ ✓ $\frac{x \times \frac{3}{4}}{x - 80} = \frac{7}{4}$ ✓ $x = 140\ km/h$ ✓	M1 M1 A1
7	$\frac{(3x-2)180}{3x} = \frac{(x-2)180}{x} + 40$ ✓ $\frac{540x - 360 - 540x + 1080}{3x} = 40$ $\frac{720}{3x} = 40$ ✓ $x = 6$ ✓	M1 M1 A1
8	$= \frac{1}{3.021} + \frac{3}{(0.071)^2} = \frac{1}{3.021} + \frac{3}{50.41 \times 10^{-2}}$ ✓ $= \frac{1}{3.021} + 3 \times \frac{1}{5.041 \times 10^{-1}}$ ✓ $= 0.3310 + 3 \times 0.1984 \times 10$ $= 6.283$ ✓	M1 M1 A1
9	$= 20\tan 32 - 20\tan 27$ ✓ $= 12.50 - 10.19$ ✓ $= 2.31m$ ✓	M1 M1 A1
10	$5^{3y} \times 5^3 + \frac{5^{3y}}{5} = 125.2$ ✓ $let\ 5^{3y} = x$ $125x + \frac{x}{5} = 125.2$ $625x + x = 626$ ✓ $x = 1$ ✓ $5^{3y} = 1 = 5^0$ $3y = 0 \Rightarrow y = 0$ ✓	M1 M1 A1 B1
11	$LCM\ of\ 5,4,12 = 60\ minutes$ ✓ $no\ of\ scripts\ marked\ in\ 60\ minutes = \frac{60}{5} + \frac{60}{4} + \frac{60}{12} = 32\ scripts$ ✓ $time\ to\ mark\ 160\ scripts = \frac{160 \times 60}{32} = 300\ minutes.$ ✓ $time\ to\ complete\ marking = 9.00 + 5.00 = 1400 = 2.00pm$ ✓	M1 M1 A1 B1
12	$\frac{437}{99} - \frac{21}{99}$ ✓ $= \frac{416}{99} = 4\frac{20}{99}\ or\ 4.\dot{2}\dot{0}$ ✓	M1 A1

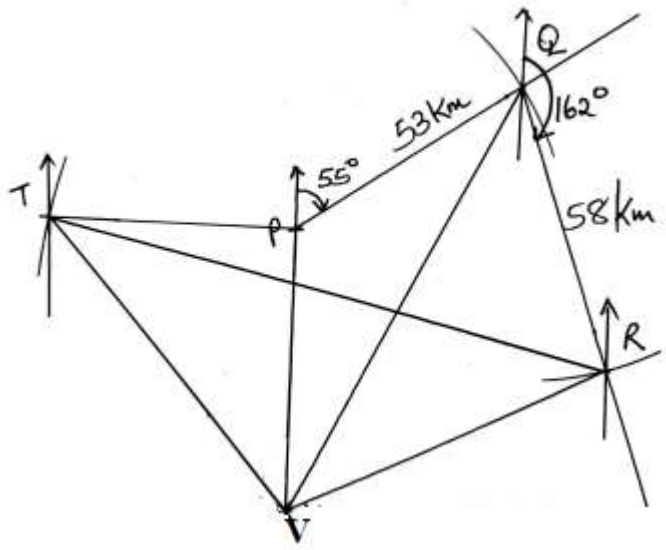
13	$height\ of\ larger\ cylinder = \frac{6237}{\frac{22}{7} \times 10.5^2} = 18\ cm$ ✓ $\frac{21}{7} = \frac{18}{h}$ ✓ $h = 6\ cm$ ✓	M1 M1 A1
14	$\%increase = \left(\frac{8}{24} \times \frac{12}{100} + \frac{4}{24} \times \frac{18}{100} + \frac{12}{24} \times \frac{40}{100}\right) \times 100$ ✓ $= \frac{27}{100} \times 100$ ✓ $= 27\%$ ✓	M1 M1 A1
15	$4\boldsymbol{p} - 3\boldsymbol{q} = \begin{pmatrix}10\\5\end{pmatrix}$ $4\boldsymbol{p} + 8\boldsymbol{q} = \begin{pmatrix}-56\\60\end{pmatrix}$ ✓ $-11\boldsymbol{q} = \begin{pmatrix}66\\-55\end{pmatrix} \Rightarrow \boldsymbol{q} = \begin{pmatrix}-6\\5\end{pmatrix}$ ✓ $\boldsymbol{p} = \frac{1}{4}\left\{\begin{pmatrix}10\\5\end{pmatrix} + 3\begin{pmatrix}-6\\5\end{pmatrix}\right\}$ ✓ $= \begin{pmatrix}-2\\5\end{pmatrix}$ ✓	M1 A1 M1 A1
16		B1-continous lines B1-dotted lines B1-complete diagram
17	a) (i) $\frac{1}{10} \times 360$ ✓ $= 36^0$ ✓ $(ii)\ 61.6 = \frac{36}{360} \times \frac{22}{7} \times r^2$ ✓ $r = \sqrt{\frac{61.6 \times 360 \times 7}{36 \times 22}}$ ✓ $r = 14\ cm$ ✓ b) (i) $61.6 = \frac{22}{7} \times r \times 14$ ✓ $r = 61.6 \times \frac{7}{22} \times \frac{1}{14} = 1.4\ cm$ ✓ (ii) $h = \sqrt{14^2 - 1.4^2} = 13.93$ ✓ $V = \frac{1}{3} \times \frac{22}{7} \times 1.4^2 \times 13.93$ ✓ $= 28.60 cm^3$ ✓	M1 A1 M1 M1 A1 M1 A1 B1 M1 A1

18	a) $1000x + 800y = 460{,}000$ ✓ $1000 \times \frac{6}{5}x + 800 \times \frac{4}{5}y = 534{,}000$ ✓ $5x + 4y = 2{,}300$ $15x + 8y = 6675$ ✓ b) $\begin{pmatrix} 5 & 4 \\ 15 & 8 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 23000 \\ 6675 \end{pmatrix}$ ✓ $\frac{1}{-20}\begin{pmatrix} 8 & -4 \\ -15 & 5 \end{pmatrix}\begin{pmatrix} 5 & 4 \\ 15 & 8 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -\frac{2}{5} & \frac{1}{5} \\ \frac{3}{4} & -\frac{1}{4} \end{pmatrix}\begin{pmatrix} 2300 \\ 6675 \end{pmatrix}$ ✓ $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -\frac{2}{5} \times 2300 + \frac{1}{5} \times 6675 \\ \frac{3}{4} \times 2300 - \frac{1}{4} \times 6675 \end{pmatrix}$ ✓ $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 415 \\ 56.25 \end{pmatrix}$ ✓ $x = Ksh\ 415, y = Ksh\ 56.25$ ✓ c) $\frac{6}{5} \times 415 \times 100 + \frac{4}{5} \times 50 \times 56.25$ ✓ $= Kshs\ 52{,}050$ ✓	B1 B1 B1 M1 M1 M1 M1 A1 M1 A1
19	(a)  	B1-ΔABC B1-$\Delta A'B'C'$ B1-coord B1-$\Delta A''B''C''$ B1-coord B1-bisectors B1-centre identified B1-cenre&angle B1-opp B1-direct

	(b) A'(2,6), B'(2,8), C'(0,6) ✓ (c) A"(5,3), B"(5,7), C"(1,3) ✓ (d) Centre(4.5,1.5) angle=90^0 ✓ (e) (i) ABC and A'B'C' ✓ (ii) A"B"C" and A'''B'''C''' ✓	
20	a) (i) $\frac{1}{2} \times 54 \times V = 810$ ✓ $V = \frac{810}{27} = 30\ m/s$ ✓ (ii) $\frac{30-0}{t-0} = \frac{5}{3}$ ✓ $t = 18s$ $acceleration = \frac{0-30}{54-18} = -8.8333$ $\therefore deceleration = 0.8333 m/s^2$ ✓ b) (i) $distance\ apart = 1 \times 60 = 60km$ ✓ $time\ taken\ to\ overtake = \frac{60}{40} = 1.5$ ✓ $time\ of\ the\ day = 11.45 + 1.30 = 1315 = 1.15pm$ ✓ (ii) $time\ the\ bus\ arrived\ at\ Y = 10.45 + \frac{600}{60} = 10.45 + 8.20 = 1905h$ ✓ $time\ the\ car\ arrived\ at\ Y = 11.45 + \frac{500}{100} = 11.45 + 5.00 = 1645h$ ✓ $waiting\ time = 1905 - 1645 = 2\ h\ 20\ mins$ ✓	M1 A1 M1 A1 M1 M1 A1 M1 M1 A1

21	a) b)  c) (i) 56-65 (ii) $55.5 + \frac{6}{2\times0.8}$ $= 55.5 + 3.75 = 59.25$ d) $\frac{5}{26} \times 100$ $= 8.929\%$	B1B1 S1-scale B1B1-rectangles B1 M1 A1 M1 A1
22	a) $-6x = -6$ ✓ $x = 1$ $\therefore Z(1,0)$ ✓ b) $L_1; y = \frac{2}{3}x - 6$ ✓ $L_2; \frac{y-0}{x-1} = -\frac{3}{2}$ ✓ $y = -\frac{3}{2}x + \frac{3}{2}$ $3x + 2y = 3$ ✓ c) (i) $\frac{y-5}{x-2} = \frac{2}{3}$ ✓ $y - 5 = \frac{2}{3}x - \frac{4}{5}$ $2x - 3y = -11$ ✓ (ii) $(3x + 2y = 3) \times 2$ $(2x - 3y = -11) \times 3$ ✓ $6x + 4y = 6$ $6x - 9y = -33 -$ ✓ $13y = 39$ $\therefore y = 3, x = -1$ $R(-1,3)$ ✓	M1 A1 M1 M1 A1 M1 A1 M1 M1 A1

Mass(kg)	41-50	51-55	56-65	66-70	71-85
Frequency	8	12	16	10	6
Height of rectangle	0.4	1.2	0.8	1.0	0.2

23	a) $\boldsymbol{OR} = \mathbf{5}\begin{pmatrix}\mathbf{2}\\\mathbf{8}\end{pmatrix} = \begin{pmatrix}\mathbf{10}\\\mathbf{40}\end{pmatrix}$ ✓ $\boldsymbol{OA} = \frac{\mathbf{3}}{\mathbf{4}}\boldsymbol{OQ} = \frac{\mathbf{3}}{\mathbf{4}}\begin{pmatrix}\mathbf{12}\\\mathbf{8}\end{pmatrix} = \begin{pmatrix}\mathbf{9}\\\mathbf{6}\end{pmatrix}$ ✓ $\boldsymbol{RA} = \boldsymbol{OA} - \boldsymbol{OR} = \begin{pmatrix}\mathbf{9}\\\mathbf{6}\end{pmatrix} - \begin{pmatrix}\mathbf{10}\\\mathbf{40}\end{pmatrix} = \begin{pmatrix}\mathbf{-1}\\\mathbf{-34}\end{pmatrix}$ ✓ b) $\boldsymbol{RL} = \boldsymbol{RO} + \boldsymbol{OL}$ $\boldsymbol{OL} = \frac{\mathbf{5}}{\mathbf{17}}\begin{pmatrix}\mathbf{2}\\\mathbf{8}\end{pmatrix} + \frac{\mathbf{12}}{\mathbf{17}}\begin{pmatrix}\mathbf{12}\\\mathbf{8}\end{pmatrix}$ ✓ $= \begin{pmatrix}\frac{10}{17}\\\frac{40}{17}\end{pmatrix} + \begin{pmatrix}\frac{144}{17}\\\frac{96}{17}\end{pmatrix} = \begin{pmatrix}\frac{154}{17}\\\frac{136}{17}\end{pmatrix}$ ✓ $\boldsymbol{RL} = \begin{pmatrix}\mathbf{-10}\\\mathbf{-40}\end{pmatrix} + \begin{pmatrix}\frac{\mathbf{154}}{\mathbf{17}}\\\frac{\mathbf{136}}{\mathbf{17}}\end{pmatrix}$ ✓ $= \begin{pmatrix}-\frac{\mathbf{16}}{\mathbf{17}}\\\mathbf{-32}\end{pmatrix}$ ✓ **c)** $\boldsymbol{RA} = \begin{pmatrix}\mathbf{-1}\\\mathbf{-34}\end{pmatrix}$; $\boldsymbol{RL} = \begin{pmatrix}-\frac{\mathbf{16}}{\mathbf{17}}\\\mathbf{-32}\end{pmatrix}$ $\boldsymbol{RL} = \frac{\mathbf{16}}{\mathbf{17}}\boldsymbol{RA}$ ✓ ***hence RL/ /RA,*** ***but R is common, therefore R, L and A are colliner*** ✓ **d)** $\boldsymbol{RL} = \frac{16}{17}\boldsymbol{RA}$ $\boldsymbol{RL}:\boldsymbol{LA} = \mathbf{16}:\mathbf{1}$ ✓	M1 M1 A1 M1 M1 M1 A1 B1 B1 B1
24	(a)  (b) (i) $(7 \pm 0.1) \times 10km$ ✓ $= 70km$ ✓ (ii) $(180^0 + 25^0) \pm 1^0$ ✓ $= 205^0$ ✓ (iii) $QV = 96km; PV = 56km; PT = 48km$ ✓	B1-Q B1-R & T B1-V B1 B1 B1 B1 B1 M1 A1

	$area\ of\ region = area\ of\ \Delta QRV + area\ of\ \Delta PQV + area\ of\ \Delta TPV$ $= \frac{1}{2} \times 58 \times 96 \sin 43 + \frac{1}{2} \times 53 \times 56 \sin 125 + \frac{1}{2} \times 48 \times 56$ ✓ $= 2{,}559.8km \cong 2{,}560km.$ ✓	