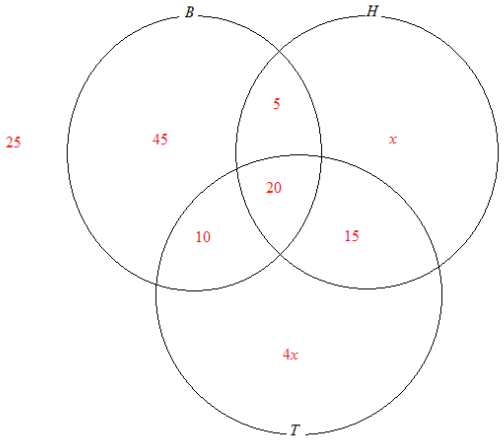
Question	Scheme		Mark	Notes
4	One of $(1,1):\quad -7+2x^2=1$ (ie 1st column) $(2,1):\quad -21-4x^2=-37$ $(3,1):\quad 35-6x^2=11$	$x=2$	6	M1 A1
	One of $(1,2):\quad 1+2\left("x"+2y\right)=1$ (ie 2nd column) $(2,2):\quad 3-4\left("x"+2y\right)=3$ $(3,2):\quad -5-6\left("x"+2y\right)=-5$	$y=-1$		M1 (DEP) A1
	One of $(1,3):\quad -"x"z-2"y"=-4$ (ie 3rd column) $(2,3):\quad -3"x"z+4"y"=-22$ $(3,3):\quad 5"x"z+6"y"=24$	$z=3$		M1 (DEP) A1

Question	Scheme			Mark	Notes
5 (a)				4	B1 25 correctly positioned B1 5, 10 and 15 correctly positioned B1 45 and 20 correctly positioned B1 $4x$ correctly positioned in T and x correctly positioned in H
(b)			150 = 25 + “45” + ”5” + x + “10” + 20 + “15” + $4x$ (oe) (ie 150 = their 8 values)	1	B1 ft
(c)	(eg 150 = “120” + $5x$ (oe))	(cao)	$x = 6$	2	M1 Collecting “their” two x terms and equating them to “their” 7 constant values A1
(d)	$\left(\frac{"10"+"20"}{"45"+"5"+"10"+"20"} =\right)$	$\frac{"30"}{"80"}$ (oe), "0.375", "37.5"%		1	B1 Ft **NB**: ft on their diagram

Question	Scheme	Mark	Notes
6 (a)	$\frac{3}{5}$, 0.6	1	B1
(b)	$\frac{3}{2}$ OR 1.5 OR not 3/2	1	B1
(c)	$y(2x-3)=6$ (oe) OR $x(2y-3)=6$ (oe) $h^{-1}: x \mapsto \frac{6+3x}{2x}$, $\frac{3(2+x)}{2x}$, $\frac{3}{x}+\frac{3}{2}$, $h^{-1}=\frac{6+3x}{2x}$ (oe)	2	M1 A1
(d)	$18x-x(2x-3)=3(2x-3)$ (removing denominators, oe, allow 1 minor slip) $2x^2-15x-9(=0)$ (oe) $x=\frac{-(-15)\pm\sqrt{((-15)^2-4\times2\times(-9))}}{2\times2}$ **NB:** on their trinomial quadratic. –0.558 8.06		M1 A1 M1 (INDEP) A1 A1

Question		Scheme		Mark	Notes
7	(a)	$65 < t \leqslant 70$ fd = 4 (8 x 1cm squares) units $70 < t \leq 80$ freq = 50 runners $80 < t \leq 95$ fd=4units $95 < t \leq 115$ fd = 4.5 units $115 < t \leq 140$ freq = 75 and fd = 3 units		5	B1 B1 B1 B1 B1 ft
	(b)		$95 < t \leq 115$	1	B1 Ft **NB:** ft on "50" for $70 < t \leq 80$
	(c)	Using a correct mid-pt At least 3 correct products $\frac{10\times62.5+20\times67.5+"50"\times75+60\times87.5+90\times105+"75"\times127.5}{305}$ $\left(=\frac{625+1350+"3750"+5250+9450+9562.5}{305}=\frac{29987.5}{305}\right)$	98 (minutes)	4	M1 M1 (DEP) M1 (DEP) A1 (cao)

Question	Scheme	Mark	Notes
8 (a) (i)	$\overrightarrow{AB} = 8\mathbf{b} - 4\mathbf{a}$	1	B1
(ii)	$\overrightarrow{PO} = -\mathbf{a}$	1	B1
(b)	$\overrightarrow{PQ} = \alpha"(8\mathbf{b} - 4\mathbf{a})" = -\mathbf{a} + \frac{8}{m}\mathbf{b}$ $\left(= \overrightarrow{PO} + \overrightarrow{OQ}\right)$ $\alpha = \frac{1}{4}$ $m = 4$	3	M1 A1 A1 **NB:** Cand. must use vectors as required by question.
(c)	$\overrightarrow{PR} = \overrightarrow{PA} + \overrightarrow{AR} = 3\mathbf{a} + \frac{1}{n}"(8\mathbf{b} - 4\mathbf{a})"$ $\overrightarrow{PR} = \left(3 - \frac{4}{n}\right)\mathbf{a} + \frac{8}{n}\mathbf{b}$, $\quad 3\mathbf{a} - \frac{4}{n}\mathbf{a} + \frac{8}{n}\mathbf{b}$, $\frac{3n\mathbf{a} - 4\mathbf{a} + 8\mathbf{b}}{n}$	2	M1 A1 **NB:** So **a** and **b** terms separated
(d)	*PR* parallel to *OB* means "comp of **a**" in $\overrightarrow{PR}$ above is zero $n = \frac{4}{3}$ (**OR** since triangles *AOB* and *ARB* are similar, $\frac{AP}{AO} = \frac{3}{4} = \frac{PR}{OB}$, Comp of **b** in (c) means that $\therefore \overrightarrow{PR} = 6\mathbf{b} = \frac{8}{n}\mathbf{b}$ (M1)**)**	2	M1 A1
(e)	Triangles *OAB* and *OPQ* are similar (oe) $\therefore \left\|\Delta OAB\right\| = 4^2 \times \left\|\Delta OPQ\right\|$ *APQB* = 150 = Triangle *OAB* □□Triangle *OPQ* $\therefore 150 = 4^2\left\|\Delta OPQ\right\| - \left\|\Delta OPQ\right\|$ (oe) $\therefore \left\|\Delta OPQ\right\| = \mathbf{10}\left(\text{cm}^2\right)$	3	M1 M1 (DEP) A1

Question		Scheme	Mark	Notes
9	(a)	Triangle S drawn and labelled	1	B1
	(b)	Triangle T drawn and labelled $\left(\Delta T = \begin{pmatrix} 2 & 3 & 3 \\ 4 & 4 & 6 \end{pmatrix}\right)$	2	B2 (-1ee)
	(c)	Either point (-2,2) indicated **OR** At least two construction lines through (-2,2) Triangle U $\left(\Delta U = \begin{pmatrix} -6 & -7 & -7 \\ 0 & 0 & -2 \end{pmatrix}\right)$ **NB:** Award M1 A2 if (-2,2) not indicated and no construction lines but ΔU drawn correctly Award M1 A1 A0 if ΔU drawn correctly except for one Vertice.	3	M1 A2 (-1ee)
	(d)	Triangle V drawn and labelled $\left(\Delta V = \begin{pmatrix} -1 & -2 & -2 \\ -1 & -1 & -3 \end{pmatrix}\right)$ **NB:** ft on "triangle U"	2	B2) ft (-1ee
	(e)	$\begin{pmatrix} -3 & 1 \\ 1 & 1 \end{pmatrix}$"$\begin{pmatrix} -1 & -2 & -2 \\ -1 & -1 & -3 \end{pmatrix}$" Triangle W drawn and labelled $\left(\Delta W = \begin{pmatrix} 2 & 5 & 3 \\ -2 & -3 & -5 \end{pmatrix}\right)$		M1 A2 (-1ee)
	(f)	-4	1	B1
	(g)	1 : 4	1	B1