Straight Line Answers

2019 P2 Q1	$(a)\ 3y = -x - 13$ $(b)\ y = x - 7$ $(c)\ \textit{Coordinates}\ (2,-5)$	3 3 2
2019 P1 Q5	$y = -\sqrt{3x} - 4$	4
2018 P1 Q1	$\bullet^1\ (1,2)$ $\bullet^2\ 2$ $\bullet^3\ y = 2x$	3
2018 P1 Q8	$\bullet^1\ m = \sqrt{3}$ or $\tan\theta = \sqrt{3}$ $\bullet^2\ 60°$ or $\frac{\pi}{3}$	2
2018 P2 Q5	$\bullet^1\ (6,1)$ $\bullet^2\ -1 \Rightarrow m_{\text{perp}} = 1$ $\bullet^3\ y = x - 5$ $\bullet^4\ 5$ $\bullet^5\ 10$	5
2017 P1 Q7	$\bullet^1\ (2,7)$ $\bullet^2\ m_{\text{median}}$ undefined $\bullet^3\ x = 2$	3
2017 P1 Q11	$\bullet^1\ \frac{2}{3}$ or $\frac{a-2}{12}$ $\bullet^2\ \frac{a-2}{12}$ or $\frac{2}{3}$ $\bullet^3\ 10$	3

2017 P2 Q1	$\bullet^1$ $(6,-1)$ $\bullet^2$ $-\frac{2}{6}$ $\bullet^3$ 3 $\bullet^4$ $y=3x-19$ $\bullet^5$ 1 $\bullet^6$ $y=x-3$ $\bullet^7$ $x=8$ or $y=5$ $\bullet^8$ $y=5$ or $x=8$	8
2016 P1 Q1	$\bullet^1$ -4 $\bullet^2$ $y+4x=-5$	2
2016 P2 Q1	$\bullet^1$ $(2,4)$ $\bullet^2$ 4 $\bullet^1$ 1 $\bullet^2$ -1 stated or implied $\bullet^3$ $y=4x-4$ $\bullet^3$ $y=-x+6$ $\bullet^7$ $x+y=6$ sub $(5,1)$ $\bullet^8$ $5+1=6$ $\bullet^9$ $\therefore$ point $(5,1)$ satisfies equation.	1 2 3 3
2015 P2 Q1	$\bullet^1$ $m_{AB}=-3$ $\bullet^2$ $m_{alt}=\frac{1}{3}$ $\bullet^3$ $y-3=\frac{1}{3}(x-13)$ $\bullet^4$ $\ldots\Rightarrow x-3y=4$ $\bullet^5$ $\mathrm{M_{AC}}=(4,5)$ $\bullet^6$ $m_{BM}=2$ $\bullet^7$ $y=2x-3$ $\bullet^8$ $x=1$ or $y=-1$ $\bullet^9$ $y=-1$ or $x=1$	3
2015 P1 Q9	$\bullet^1$ $m_{AB}=-\sqrt{3}$ $\bullet^2$ $m_{BC}=-\frac{1}{\sqrt{3}}$ $\bullet^3$ $m_{AB}\neq m_{BC}\Rightarrow$ points are not collinear.	4 3 2
2014 P2 Q1	$y-1=-1(x-4)$ $x=1,\ y=4$ 116·6°	4 2 2

2013 P2 Q2	$y-6=\frac{1}{2}(x-5)$ x = 1, y = 4 R(–3, 2) S (–1, –2)	3 3 3
2012 P1 Q 23	$y-3=\frac{1}{3}(x-1)$ $y-(-2)=-3(x-1)$ $x=-\frac{1}{2}$ $y=\frac{5}{2}$ $\sqrt{\frac{5}{2}}$ accept $\frac{\sqrt{10}}{2}$ or $\sqrt{2\cdot 5}$	4 2 3 2
2011 P1 Q21	$y-(-3)=3(x-2)$ **or** $y-12=3(x-7)$ x = 5, y = 6 $y-10=-2(x-3)$ **but not** $y-6=-2(x-5)$ when $x=5$, $y=-2\times 5+16=6$ **or** $2\times 5+6-16=0$	2 3 5
2010 P1 Q21	$y-16=-\frac{2}{5}(x-(-4))$ **or** $y-10=-\frac{2}{5}(x-11)$ e.g. Substitution : $2(6)+5(12)=12+60=72$ Gradients : $m_{BT}=-\frac{4}{10}=-\frac{2}{5}=m_{BQ}$ Vectors : $\overrightarrow{BT}=\begin{pmatrix}10\\-4\end{pmatrix}$, $\overrightarrow{TQ}=\begin{pmatrix}5\\-2\end{pmatrix}$ and $\overrightarrow{BT}=2\overrightarrow{TQ}$ Method 1 : Vector approach •⁵ e.g. $\overrightarrow{BT}=\begin{pmatrix}10\\-4\end{pmatrix}$ and $\overrightarrow{TQ}=\begin{pmatrix}5\\-2\end{pmatrix}$ •⁶ 2 : 1 Method 2 : "Stepping out" approach •⁵ e.g. B —10— T —5— Q or B(–4) T(6) Q(11), 10, 5 •⁶ 2 : 1 Method 3 : Distance Formula approach •⁵ e.g. $d_{BT}=\sqrt{116}$ and $d_{TQ}=\sqrt{29}$ •⁶ 2 : 1	3 1 2

2009 P1 Q21	$P = (-3, 0)$ $y - 0 = \frac{1}{2}(x + 3)$ x = 5, y = 4	1 3 4
2008 P2 Q1	*(a) Proof (b) y = -3x+10 (c) (3,1)*	4 3 3
2007 P1Q1	$y = 3x + 7$	
2006 P1Q1	(a) $y - 5 = 2(x - 3)$ or $y + 5 = 2\,(x - (-2))$ etc (b) $y - 12 = -3(x - (-1))$ (c) (2, 3)	
2006 P2Q1	(a) proof $m_{PS} = 3$ $m_{QS} = -\frac{1}{3}$ $y - 6 = -\frac{1}{3}(x - 4)$ (b) Q = (22, 0) R = (24, 6)	
2005 P1Q1	$y - 0 = \sqrt{3}(x - (-2))$	
2004 P1Q1	(a) $m_{AB} = 3$ (b) $m_{AB} = 3 \Rightarrow m_{perp} = -\frac{1}{3}$ $y = -\frac{1}{3}x - \frac{1}{3}$ $m_{l_1} = -\frac{1}{3}$ $m_{l_2} = -\frac{2}{5}$ so only the 1st line is perpendicular to AB.	
2004 P2Q1	(a) $a = 26{\cdot}6°$ (b) 1·5	
2003 P1Q1	$x - 4y + 13 = 0$	

2002W P1Q1	(*a*) $y + x = 4$ (*b*) $135°$
2002W P2Q1	(*a*) $2y + x = 6$, T(2, 2) (*b*) P(–1, –4)
2002 P2Q1	(*a*) $y = 2$ (*b*) $y = -2x + 2$ (*c*) (0, 2)
2001 P1Q1	$2x + 3y = 1$
2001 P2Q7	(*a*) $x = 7$ (*b*) $3x + 2y = 23$ (*c*) (7, 1) (*d*) $(x - 7)^2 + (y - 1)^2 = 26$
2000 P1Q3	30 degrees
2000 P2Q2	(*a*) $x + 2y = 9$
Specimen 2 P1Q2	$m_{AB} = \frac{3}{4} \Rightarrow m_{perp} = -\frac{4}{3}$ midpoint $= (1,2)$ $y - 2 = -\frac{4}{3}(x - 1)$
Specimen 2 P1Q4	angle between line and x-axis $= \frac{\pi}{2} - \frac{\pi}{3}$ gradient $= \tan\frac{\pi}{6} = \frac{1}{\sqrt{3}}$
Specimen 1 P1Q1	$y = -2x - 3$
Specimen 1 P2Q1	$y = 2x - 5$