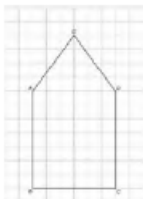| Q	Answer	Mark	Comments
1	$\dfrac{15-8}{6-2}$ or $\dfrac{7}{4}$	M1	oe eg $\dfrac{8-15}{2-6}$ or 1.75 may be embedded in an attempt at equation of line eg $y = \dfrac{7}{4}x...$ may be implied
	$-1 \div$ their $\dfrac{7}{4}$ or $-\dfrac{4}{7}$ or $\dfrac{17-9}{x-0} \times$ their $\dfrac{7}{4} = -1$	M1	oe allow $[-0.57143, -0.57]$ may be embedded in an attempt at equation of a line eg $y =$ their $-\dfrac{4}{7}x \,...$
	$17 - 9 =$ their $-\dfrac{4}{7}x$ or $-4x = 56$ or $56 \div -4$	M1dep	oe equation must be of the form $ax = b$ (b can be unprocessed) dep on 2nd M1
	-14	A1	

		Additional Guidance	
		The second mark is not dependent on the first – see examples below	
		(gradient of line through given points =) $\dfrac{6-2}{15-8} = \dfrac{4}{7}$	M0
		(gradient of perpendicular line =) $-\dfrac{7}{4}$	M1
		$17 - 9 = -\dfrac{7}{4}x$	M1
1 cont		(gradient of line through given points =) $-\dfrac{7}{4}$	M0
		$\dfrac{17-9}{x} \times -\dfrac{7}{4} = -1$	M1
		$-56 = -4x$	M1
		(gradient of line through given points =) $\dfrac{7}{4}$	M1
		(gradient of perpendicular line =) $\dfrac{4}{7}$	M0M0
		Condone use of letters for gradients eg $x = 1.75$	M1
		For the first two marks, condone inclusion of x in their gradients	
		Answer -14 that comes from rounding or truncating cannot score A1	
		eg1 (perp grad =) -0.57 $8 = -0.57x$ Answer -14	M3A1
		eg2 (perp grad =) -0.57 $8 = -0.57x = -14.03$ Answer -14	M3A0

Q	Answer	Mark	Comments
	Alternative method 1 – using the equations of the lines		
2	$\dfrac{22-y}{8-0}=2$ or $22=2\times 8+c$ or $(c=)\,22-2\times 8$ or $c=6$ or P is at $(0,6)$ or $(PR=)\,y=2x+6$ or y-coordinate of P is 6 or y-coordinate of Q is 6	M1	oe equation using any letter y is the y-coordinate of P ignore missing brackets may be seen on diagram may be seen on diagram
	$2m=-1$ or $(m=)-\dfrac{1}{2}$	M1	oe gradient of RQ
	$22=\text{their }-\dfrac{1}{2}\times 8+c$ or $22=-4+c$ or $c=26$ or $(RQ=)\,y=-\dfrac{1}{2}x+26$	M1dep	oe equation in c dep on previous mark oe equation of RQ
	their $(-\dfrac{1}{2}x+26)=$ their 6 or x-coordinate of Q is 40	M1dep	oe equation in x where x is the x-coordinate of Q dep on M3 $-\dfrac{1}{2}=\dfrac{22-\text{their }6}{8-x}$ implies M4 if their 6 is correct or from correct working
	$(40,6)$	A1	

	Alternative method 2 – using similar triangles		
2 cont	Drops a perpendicular from R to point S on PQ and uses $RS = 2PS = 16$ to work out that P is at $(0, 6)$	M1	any or no letter eg $22 - 2 \times 8$
	$2m = -1$ or $(m =) -\dfrac{1}{2}$ or $\dfrac{RS}{SQ} = \dfrac{1}{2}$	M1	oe gradient of RQ
	16×2 or 32	M1dep	length of SQ may be seen on diagram dep on previous mark
	$8 +$ their 32 or x-coordinate of Q is 40	M1dep	
	$(40, 6)$	A1	
	Additional Guidance		
	Note that 40 (for the x-coordinate of Q) implies M3 (on alt 2) and implies M4 if 6 is also seen (on alt 1)		

Q	Answer	Mark	Comment
3	**Alternative method 1**		
	$\dfrac{8-0}{4-0}$ or 2	M1	oe gradient from origin to point
	$-\dfrac{1}{2}$ or $y=-\dfrac{1}{2}x$ ...	M1	oe gradient of tangent negative inverse of their gradient
	$8=$ their $-\dfrac{1}{2}\times 4+c$ or $c=10$	M1dep	oe equation in c (any letter) dep on previous mark
	$0=$ their $-\dfrac{1}{2}x+$ their 10	M1	oe equation in x ft their equation of the form $y=mx+c$ where m and c are numbers $\neq 0$
	20	A1	condone (20, 0)
	Alternative method 2		
	$\dfrac{8-0}{4-0}$ or 2	M1	oe gradient from origin to point
	$-\dfrac{1}{2}$ or $y=-\dfrac{1}{2}x$ ...	M1	oe gradient of tangent negative inverse of their gradient
	$\dfrac{8-0}{4-x}=$ their $-\dfrac{1}{2}$	M1dep	oe equation in x dep on previous mark
	their $2\times(8-0)=$ their $-1\times(4-x)$ or $16=-4+x$	M1dep	oe linear equation in x
	20	A1	condone (20, 0)

3 (cont)	**Alternative method 3**		
	$\dfrac{8-0}{4-0}$ or 2	M1	oe gradient from origin to point
	$-\dfrac{1}{2}$ or $y = -\dfrac{1}{2}x \ldots$	M1	oe gradient of tangent negative inverse of their gradient
	$y - 8 = $ their $-\dfrac{1}{2} \times (x - 4)$	M1dep	oe equation eg $x + 2y = 20$ dep on previous mark
	$0 - 8 = $ their $-\dfrac{1}{2} \times (x - 4)$	M1	oe linear equation in x ft their equation in y and x
	20	A1	condone (20, 0)
	Alternative method 4		
	$4^2 + 8^2$ and $(x-4)^2 + 8^2$	M1	
	$x^2 = 4^2 + 8^2 + (x-4)^2 + 8^2$	M1dep	oe equation in x
	$x^2 = 16 + 64 + x^2 - 8x + 16 + 64$	M1dep	oe equation in x with brackets expanded and squares evaluated
	$8x = 16 + 64 + 16 + 64$ or $8x = 160$	M1dep	oe linear equation in x
	20	A1	condone (20, 0)

Q	Answer	Mark	Comments
4	Fully correct diagram with all these 6 conditions met • Line length 6 cm from B • Line perpendicular to AB from B • Line length 7 cm parallel to AB • Area of pentagon = 54 cm^2 • Pentagon has exactly one line of symmetry • Labelled pentagon	B4	B3 5 conditions met B2 4 conditions met B1 3 conditions met condone label E missing

	Additional Guidance	
	Mark intention	
	Ignore any lines inside the shape eg lines of symmetry	
	A diagram that is not a pentagon can only meet the first 3 conditions	B0 or B1
		B4

Q	Answer	Mark	Comments
5(a)	$(m_1 =) \dfrac{-7-9}{3--5}$ or $(m_1 =) \dfrac{9--7}{-5-3}$ or -2	M1	gradient of AC
	$-1 \div$ their -2 or $\dfrac{1}{2}$	M1	gradient of line perpendicular to AC their -2 must be identified as a gradient $\dfrac{1}{2}$ implies M1M1
	$-7 =$ their $\dfrac{1}{2} \times 3 + c$ or $(c =) -8.5$ or $y--7 =$ their $\dfrac{1}{2}(x-3)$	M1dep	oe condone any letter for c dep on 2nd M1
	$y = \dfrac{1}{2}x - 8.5$	A1	oe eg $2y = x - 17$

	Additional Guidance	
	Check part (a) for working for part (b)	