1	(6, 7)	B1	

Question	Answer	Mark	Comments
2	(4, 16)	B2	may be on diagram B1 one correct coordinate SC1 (16, 4)
	Additional Guidance		
	B1 may be scored from 4 at the vertex vertically below Q or from 16 at the vertex vertically above P if not contradicted by the answer		

Q	Answer	Mark	Comments
3	$\left(0, -\frac{2}{3}\right)$	B1	

Q	Answer	Mark	Comments
4	(Gradient of PQ =) $\frac{14-8}{2-6}$ or $\frac{8-14}{6-2}$ or -1.5 or $\frac{-3}{2}$ or (gradient of QR =) $\frac{8-5}{6-2}$ or $\frac{5-8}{2-6}$ or 0.75 or $\frac{3}{4}$ or $\frac{-3}{-4}$	M1	oe
	(Gradient of PQ =) -1.5 or $\frac{-3}{2}$ and (gradient of QR =) 0.75 or $\frac{3}{4}$ or $\frac{-3}{-4}$	M1dep	oe
	No and $-1.5 \times 0.75 \neq -1$ or No and $-1.5 \times 0.75 = -1.125$	A1ft	oe eg No and $\frac{-3}{2} \times \frac{3}{4} = -\frac{9}{8}$ ft their two gradients with M1 scored accept No and -1.5 is not the negative reciprocal of 0.75
	Additional Guidance		
	Accept $-\frac{3}{2}$ or $\frac{3}{-2}$ for $\frac{-3}{2}$		
	Gradient of $PQ = \frac{-3}{2}$, gradient of $QR = \frac{4}{3}$, No and $\frac{-3}{2} \times \frac{4}{3} = -2$		M1M0A1ft
	Answers involving Pythagoras' theorem or scale drawing		M0M0A0

Q	Answer	Mark	Comments
5	(32, 8)	B3	B2 E (32, …) or E (…, 8) B1 C (17, 18) or D (23, 14) SC1 $C(a, b)$ and $D(a+6, b-4)$
	Additional Guidance		
	Mark the answer line for B3 and B2 (if blank check working lines and diagram)		
	B1 or SC1 is likely to be seen in working lines or on the diagram		
	Condone missing brackets eg C 17, 18		B1
	Coordinates can be implied eg D $x = 23$ $y = 14$		B1
	Condone answers given as vectors for B2, B1 or SC1 eg $C\begin{pmatrix}17\\18\end{pmatrix}$		B1
	SC1 C cannot be (5, 26) or (11, 22) and coordinates of D must be evaluated eg C (15, 17) and D (21, 13)		SC1

Q	Answer	Mark	Comments
6	$\sqrt[4]{81}$ or $81^{\frac{1}{4}}$ or $k = 3$	M1	may be seen on diagram and is implied by $p = 9$
	(their value for $k)^2 = 2^2 + c$ or $9 = 4 + c$ or $c = 5$	M1	does not need to be evaluated
	r^2 + their 5 = 43.44 or $\sqrt{43.44 - \text{their } 5}$ or $\sqrt{38.44}$	M1dep	oe equation dep on previous mark
	6.2	A1	
	Additional Guidance		
	Coordinate (2, 9) implies $p = 9$		

Q	Answer	Mark	Comments
7	**Alternative method 1 – using the equations of the lines**		
	$\frac{22-y}{8-0}=2$ 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 $(m=)\ -\frac{1}{2}$	M1	oe gradient of RQ
	$22=$ their $-\frac{1}{2}\times 8+c$ or $22=-4+c$ or $c=26$ or $(RQ=)\ y=-\frac{1}{2}x+26$	M1dep	oe equation in c dep on previous mark oe equation of RQ
	their $(-\frac{1}{2}x+26)=$ 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 $-\frac{1}{2}=\frac{22-\text{their } 6}{8-x}$ implies M4 if their 6 is correct or from correct working
	(40, 6)	A1	

7 cont	**Alternative method 2 – using similar triangles**		
	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 $(m =) -\frac{1}{2}$ or $\frac{RS}{SQ} = \frac{1}{2}$	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	Comments
8	Identifies (6, 3) or (7, 9) or (–4, 3) or (–3, 9)	M1	may be seen on the grid mark intention on diagram eg parallelogram drawn with one of the vertices at (6, 3) or (6, 3) plotted
	Identifies (6, 3) and (7, 9) **or** identifies (–4, 3) and (–3, 9)	M1dep	may be seen on the grid mark intention on diagram eg parallelogram drawn with two of the vertices at (6, 3) and (7, 9) **or** (6, 3) and (7, 9) plotted
	Both diagonals drawn for one of the correct parallelograms or centre of one of the correct parallelograms identified or (4, 6) or (–1, 6)	M1dep	mark intention on diagram M3 may be implied eg $\left(\frac{1+7}{2}, \frac{9+3}{2}\right)$ or $\left(\frac{-4+2}{2}, \frac{9+3}{2}\right)$
	(4, 6) and (–1, 6)	A1	
	Additional Guidance		
	Up to M3 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts		
	Both answers correct (ignore working)		M3A1
	One answer correct (ignore working)		M3A0
	For first 2 marks condone correct points plotted even if labelled incorrectly		
	Up to M2 can be awarded for coordinates given as answers		
	Arc centre *A* radius 5 cm passing through (6, 3) and/or (–4 , 3) is not sufficient to award M1 etc		

Q	Answer	Mark	Comments
9(a)	(0, 2)	B1	
	Additional Guidance		

Q	Answer	Mark	Comments
10	7	B1	

Q	Answer	Mark	Comment
11	$4 = 0^2 + p \times 0 + r$ or $r = 4$	M1	oe equation may be implied
	$1^2 + p\ (\times 1) +$ their $4 = 3$ or $p = -2$	M1	oe equation allow their 4 to be r
	$8^2 +$ (their -2) $\times 8 +$ their 4 or $64 - 16 + 4$	M1dep	oe dep on M1M1 do not allow their 4 to be r
	52	A1	

Q	Answer	Mark	Comment
12	$(0, -6)$	B1	

Q	Answer	Mark	Comments
13	$-\frac{5}{4}$ or $-1\frac{1}{4}$ or -1.25	B2	B1 $\frac{5}{4}$ or $1\frac{1}{4}$ or 1.25 or $x+4$ and $y-5$ or possible coordinates for P and Q stated or shown on a diagram eg $P(0, 5)$ and $Q(4, 0)$ or right-angled triangle shown with 4 as horizontal length and 5 as vertical length

Additional Guidance	
B1 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts	
Ignore attempts at rounding after correct answer seen	
Accept $\frac{-5}{4}$	B2
Condone $\frac{5}{-4}$	B2
$(x+4)$ $(y-5)$	B1
$x+4$ and $y-5$ may be seen embedded in a fraction eg $\frac{y-(y-5)}{x-(x+4)}$ or $\frac{y-(y-5)}{x+(x+4)}$	B1
$-\frac{4}{5}$	B0
$\frac{4}{5}$	B0

Q	Answer	Mark	Comment
14(a)	(2, –1)	B1	may be seen on diagram

Q	Answer	Mark	Comments
15(a)	C (0, 6)	B1	if answer space is blank, accept (0, 6) written at C on the diagram
	D (3, 0)	B1	if answer space is blank, accept (3, 0) written at D on the diagram
	Additional Guidance		
	For each part mark the answer space unless blank		
	Allow x and y written above the coordinates but do not allow eg $(0x, 6y)$		

Q	Answer	Mark	Comments
16(a)	Correct method for finding the difference between the x or y coordinates for line AC	M1	may be on diagram eg $9 - -7$ or 16 or $3 - -5$ or 8
	Correct method for finding the difference between the x or y coordinates for line AB or line BC	M1dep	may be on diagram eg $16 \div (1 + 3)$ or 4 or $8 \div (1 + 3)$ or 2 or $16 \times \frac{3}{(1+3)}$ or 12 or $8 \times \frac{3}{(1+3)}$ or 6
	(–3, 5)	A1	
	Additional Guidance		
	Up to M2 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts		
	Condone any missing minus signs if absolute values for the differences are correct		
	(–3, …) or (…, 5)		M1M1A0