

10(a)	Attempt to substitute for x or y to produce quadratic equation in one variable
	Obtain $5x^2 - 40x + 75 = 0$ or $5y^2 - 20 = 0$
	Find two values of one variable
	Obtain coordinates $(3, 2)$ and $(5, -2)$
10(b)	Obtain centre $(0, -2)$ [and radius 5]
	Attempt area of ABC using mid-point of AB or $\frac{1}{2} \times \text{base} \times \text{height}$
	Obtain $\frac{1}{2} \sqrt{20} \times \sqrt{20}$ or $\frac{1}{2} \times 5 \times 4$ (or equivalent) and hence 10

7(a)	[Centre is] $(4, 6)$
	$\sqrt{3^2 + 5^2}$ or $3^2 + 5^2$ or $\sqrt{6^2 + 10^2}$ or $6^2 + 10^2$ oe
	$(x - \text{their } 4)^2 + (y - \text{their } 6)^2 = (\text{their radius})^2$
	$(x - 4)^2 + (y - 6)^2 = 34$ or $x^2 + y^2 - 8x - 12y + 18 = 0$

7(b)

$$[\text{Gradient of } PQ =] \frac{11-1}{7-1} \text{ or } \frac{5}{3} \text{ oe}$$

$$[\text{Gradient of tangent} =] -\frac{3}{5}$$

$$\frac{y-11}{x-7} = -\frac{3}{5} \text{ oe e.g. } y = -\frac{3}{5}x + \frac{76}{5}$$

Alternative Method for Question 7(b):

$$2(x-4) + 2(y-6)\frac{dy}{dx} = 0$$

$$\text{Substitute } x = 7, y = 11 \Rightarrow 6 + 10\frac{dy}{dx} = 0 \Rightarrow \frac{dy}{dx} = -\frac{3}{5}$$

$$\frac{y-11}{x-7} = -\frac{3}{5} \text{ oe e.g. } y = -\frac{3}{5}x + \frac{76}{5}$$

7(c)	y -coordinate of R is 1
	[Equation of tangent at R is] $\frac{y-1}{x-7} = \frac{3}{5}$ oe eg $y = \frac{3}{5}x - \frac{16}{5}$
	$\frac{3}{5}(x-7)+1 = -\frac{3}{5}(x-7)+11 \Rightarrow x = \dots$ or $y = \dots$
	$x = \frac{46}{3}$ oe and $y = 6$
	Alternate Method for Question 7(c):
	y -coordinate of R is 1
	y -coordinate of point of intersection is 6
	Then either
	$6-11 = -\frac{3}{5}(x-7)$
	Or
	$(x-4)^2 = 34 + (x-7)^2 + 25$
	$x = \frac{46}{3} \left[\frac{46}{3}, 6 \right]$ oe

6(a)	$2x^2 - 2x(11x + 3) + 2 [= 0]$
	$-20x^2 - 6x + 2 [= 0] \Rightarrow [(5x - 1)(2x + 1) = 0]$
	Coordinates $\left(-\frac{1}{2}, -\frac{5}{2}\right), \left(\frac{1}{5}, \frac{26}{5}\right)$
6(b)	$2x^2 - kx(4x + 3) + 2 = 0 \Rightarrow (2 - 4k)x^2 - 3kx + 2 [= 0]$
	$(2 - 4k)x^2 - 3kx + 2 [= 0]$
	$b^2 - 4ac = 9k^2 - 4 \times (2 - 4k) \times 2$
	$9k^2 + 32k - 16 [< 0] \Rightarrow (k + 4)(9k - 4) [< 0]$
	$-4 < k < \frac{4}{9}$

8	Centre of circle is $(3, -5)$
	$x = -2 \Rightarrow y^2 + 10y - 11 [= 0] \Rightarrow (y - 1)(y + 11) = 0$ or $(y + 5)^2 = 36$.
	$y = 1$ and $y = -11$
	Gradient of line PC is $\frac{-5-1}{3-(-2)} \left[= \frac{-6}{5} \right]$ or gradient of line QC is $\frac{-5+11}{3-(-2)} \left[= \frac{6}{5} \right]$
	Gradient of tangent at P is $\frac{5}{6}$ or gradient of tangent at Q is $-\frac{5}{6}$
	Equation of tangent is $y - 1 = \frac{5}{6}(x + 2)$. Crosses $y = -5$ at $x = -\frac{46}{5}$, so distance = $\frac{36}{5}$ or equations of two tangents are $y - 1 = \frac{5}{6}(x + 2)$ and $y + 11 = -\frac{5}{6}(x + 2)$ and these meet when $x = -\frac{46}{5}$ so distance = $\frac{36}{5}$
	Area = $\frac{1}{2} \times 12 \times \text{their } \frac{36}{5}$
8	$\frac{432}{10}$ or $\frac{216}{5}$ or 43.2

8(a)	$(2, -2)$
	$(12, -2)$
	$(7, -4)$
8(b)	$\tan\left(\frac{1}{2}\theta\right) = \frac{5}{2} \left[\Rightarrow \theta = 2 \tan^{-1} \frac{5}{2} \right]$ or $\sin\left(\frac{\theta}{2}\right) = \frac{5}{\sqrt{29}}$ or $\cos\left(\frac{\theta}{2}\right) = \frac{2}{\sqrt{29}}$ or $\theta = \pi - 2 \times \tan^{-1} \frac{2}{5}$ or $\pi - 2 \times 0.381$ or $10^2 = 29 + 29 - 2 \times \sqrt{29} \times \sqrt{29} \cos \theta \left[\Rightarrow \cos \theta = \frac{29 + 29 - 100}{2 \times \sqrt{29} \times \sqrt{29}} = \frac{-21}{29} \right]$
	$[\theta =] 2.38$
	Alternative Method for Question 8(b)
	$\tan \theta = \frac{\frac{-2}{5} - \frac{2}{5}}{1 + \frac{-2}{5} \times \frac{2}{5}} \left[= -\frac{20}{21} \right]$
	$[\theta =] 2.38$

8(c)	[Length $AC = \text{Length } BC = \sqrt{5^2 + 2^2}] = \sqrt{29} [=5.385\dots]$
	[Area of large sector =] $\frac{1}{2} \times \sqrt{29} \times \sqrt{29} \times (2\pi - \text{their } \theta) [= 56.587\dots]$ or [Area of small sector =] $\frac{1}{2} \times \sqrt{29} \times \sqrt{29} \times \text{their } \theta [= 34.518\dots]$
	Area of triangle = $\frac{1}{2} \times \sqrt{29} \times \sqrt{29} \times \sin \theta$ or $\frac{1}{2} \times 10 \times 2 [= 10]$
	[Segment area =] 66.6