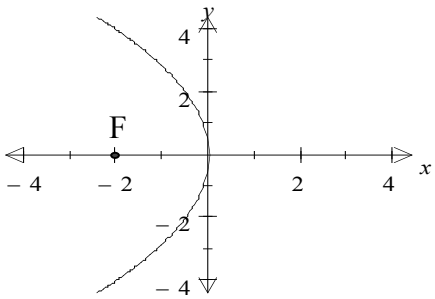
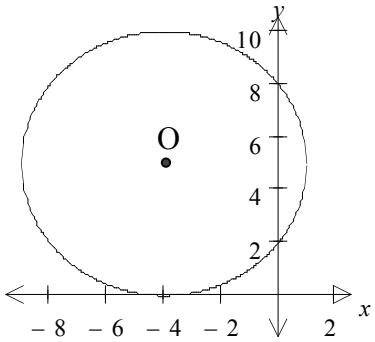
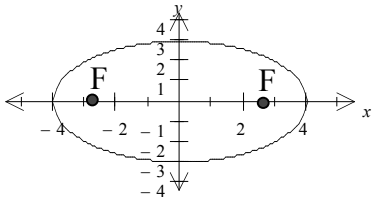
Assessment Schedule 2006

Calculus: Sketch graphs of conic sections and write equations related to conic sections (90639)

Evidence Statement

	Achievement Criteria	Q.	Evidence	Code	Judgement	Sufficiency
Achievement	Sketch graphs of conic sections and write equations relating to conic sections.	1	Parabola : vertex (0,0) Focus (–2,0)  	A1	Vertex and focus identified. Parabolic shape. Two other points on curve to check shape eg (–2,4) and (–2,–4).	**Achievement:** **Four** of Code A **including** at least **one** of Code A1 **and** at least **one** of Code A2. No repeated skills.
		2	Circle: radius 5, centre (–4,5) Intercepts (–4,0), (0,2), (0,8)  	A1	Centre and intercepts identified.	
		3	Ellipse: centre (0,0) $a = 4$, $b = 3$ Intercepts (±4,0), (0,±3) Foci: ($\pm\sqrt{7}$,0)  	A1	Centre, foci and intercepts identified.	
		4a	$\frac{x^2}{9} - \frac{y^2}{4} = 1$ $(x = 3\sec t, y = 2\tan t)$	A2	Or equivalent.	
		4b	$y^2 = \frac{1}{2}(x+2)$ $\left(x = \frac{1}{8}t^2 - 2, y = \frac{1}{4}t\right)$	A2	Or equivalent.	

	Achievement Criteria	Q.	Evidence	Code	Judgement	Sufficiency
Achievement with Merit	Solve problems involving conic sections.	5	$\frac{2x}{3} - \frac{2y}{8}\frac{dy}{dx} = 0$ $\frac{dy}{dx} = \frac{8x}{3y}$ At (3,4) $\frac{dy}{dx} = 2$ $y - 4 = 2(x - 3)$ $2x - y - 2 = 0$	A2 M	Or equivalent.	**Merit:** Achievement **plus** **Two** of Code M **or** **Three** of Code M.
		6	Equation of ellipse: $\frac{x^2}{25} + \frac{y^2}{16} = 1$ Focus: F(c,0) $c^2 = a^2 - b^2$ $c^2 = 25 - 16$ $c = 3$ When $c = 3$, $y = 3.2$	A2 M	Correct equation of conic section. Or equivalent.	
		7	Centre (0, 950) Radius = 850 $x^2 + (y - 950)^2 = 850^2$ When $y = 500$, $x = -721.11$ When $y = 1500$, $x = 648.1$ Pythagoras gives: Distance = 1695.5 metres	A2 M	Correct equation of conic section. Or equivalent.	

	Achievement Criteria	Q.	Evidence	Code	Judgement	Sufficiency
Achievement with Excellence	Solve more complex conic section problems.	8	Equation of directrix: $x = h - a$ Length of PN: $x - (h - a) = x - h + a$ Length of PF: $\sqrt{(x-(a+h))^2 + (y-k)^2}$ Length PN = length PF, so $(x-(h-a))^2 = (x-(a+h))^2 + (y-k)^2$ $x^2 - 2(h-a)x + (h-a)^2$ $= x^2 - 2(a+h)x + (a+h)^2 + (y-k)^2$ $4ax - 4ah = (y-k)^2$ $(y-k)^2 = 4a(x-h)$ QED.	A M E	Accept any valid method. Accept minor arithmetic error.	**Excellence:** Merit **plus** Code E.

Judgement Statement

Calculus: Sketch graphs of conic sections and write equations related to conic sections (90639)

Achievement	Achievement with Merit	Achievement with Excellence
Sketch graphs of conic sections and write equations related to conic sections. $4 \times$ A including at least $1 \times$ A1 and $1 \times$ A2 No repeated skills	Solve problems involving conic sections. Achievement *plus* $2 \times$ M	Solve more complex conic section problems. Merit *plus* $1 \times$ E