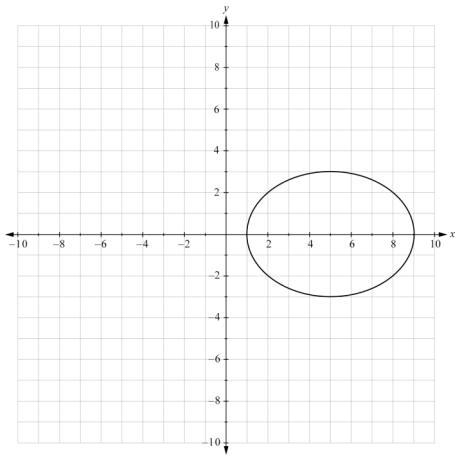
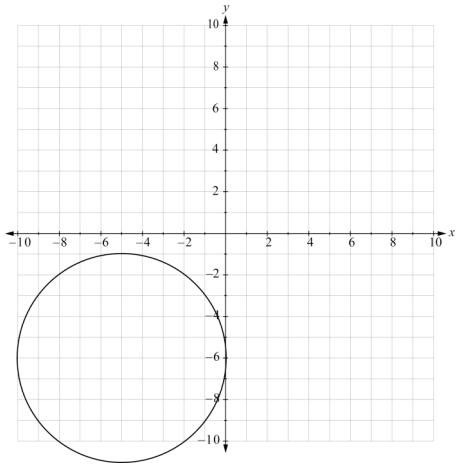
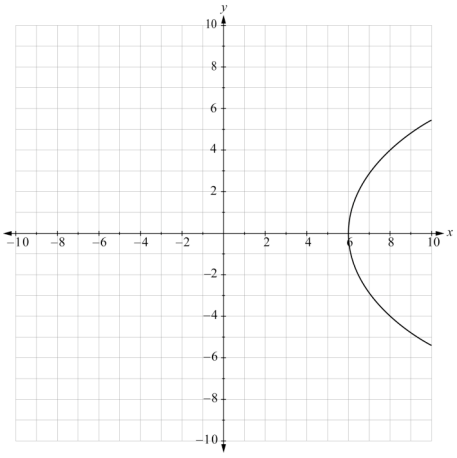
Assessment Schedule – 2007

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 related to conic sections	1	Ellipse centre (5,0) Major axis 8 Minor axis 6 	A1	Ellipse through (1,0), (9,0), (5,3) and (5,–3) Centre and intercepts indicated by sketch.	**Achievement:** FOUR of code A including at least ONE of code A1 AND ONE of code A2
		2	Circle, centre (–5,–6), radius 5 	A1	Circle, centre (–5,–6), and *y*-intercept (0,–6) Centre and intercept indicated by sketch.	

ACHIEVEMENT		3	Parabola $y^2 = 8(x-6)$ 	A1	Parabola vertex (6,0), passing through (8,4) and (8,–4).	
		4(a)	$\frac{(x+3)^2}{9} + \frac{(y-2)^2}{4} = 1$ OR $x = 3\cos\theta - 3$, $y = 2\sin\theta + 2$	A2	Or equivalent.	**Achievement:** FOUR of code A including at least ONE of code A1 AND ONE of code A2
		4(b)	$\frac{(x+4)^2}{16} - \frac{y^2}{16} = 1$ OR $x = 4\sec\theta - 4$, $y = 4\tan\theta$	A2	Or equivalent.	

ACHIEVEMENT WITH MERIT	Solve problems involving conic sections.	5	$\frac{dx}{d\theta} = -9\sin\theta$ $\frac{dy}{d\theta} = 9\cos\theta$ $\frac{dy}{dx} = -\frac{\cos\theta}{\sin\theta}$ $m_T = -1$ at $\theta = \frac{\pi}{4}$ $y - \frac{9}{\sqrt{2}} = -1\left(x - \left(\frac{9}{\sqrt{2}} + 2\right)\right)$ $\sqrt{2}x + \sqrt{2}y - 18 - 2\sqrt{2} = 0$	A2 M	Accept alternative method Or equivalent. Accept $y = -x + 14.7$	**Merit:** Achievement **PLUS** TWO of Code M **OR** THREE of Code M
		6	$\frac{x^2}{32^2} + \frac{y^2}{8^2} = 1$ $y = 12 - 8 = 4$ $\frac{x^2}{1024} + \frac{16}{64} = 1$ $x = \sqrt{768} = 27.7$ $2x = 55.4$ Number of books = $\frac{55.4}{3} = 18.47$ $\therefore$ 18 books	A2 M	Equation of ellipse. Or equivalent.	
		7	Straight line equation is $y = x + 8$ $\frac{y^2}{4} - \frac{(y-8)^2}{12} = 1$ $12y^2 - 4(y^2 - 16y + 64) = 48$ $8y^2 + 64y - 304 = 0$ $y = 3.3$ or -11.3 Height at Z is 3.3 m	A2 or M	Accept alternative method. Units not necessary.	

ACHIEVEMENT WITH EXCELLENCE	Solve more difficult conic section problems.	8	$x^2 = 4fy$ $\frac{dy}{dx} = \frac{2x}{4f}$ $\frac{dy}{dx} = \frac{p}{2f}$ at point P $y - q = \frac{p}{2f}(x - p)$ $2fy - 2fq = px - p^2$ $2fy - 2fq = px - 4fq$ $2qx - py - pq = 0$	A2 M E	Equation of parabola Equation of tangent Or equivalent. Equation must be in the form of $ax + by + c = 0$	**Excellence:** Merit **plus** Code E

Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
Sketch graphs of conic sections and write equations related to conic sections. 4 x A including at least 1 × A1 *and* 1 × A2	Solve problems involving conic sections. **Achievement** *plus* 2 × M	Solve more complex conic section problems. **Merit** *plus* 1 × E

The following Mathematics specific marking conventions may also have been used when marking this paper:

- Errors are circled.
- Omissions are indicated by a caret (^).
- **NS** may have been used when there was not sufficient evidence to award a grade.
- **CON** may have been used to indicate 'consistency' where an answer is obtained using a prior, but incorrect answer and **NC** if the answer is not consistent with wrong working.
- **CAO** is used when the 'correct answer only' is given and the assessment schedule indicates that more evidence was required.
- **#** may be used when a correct answer is obtained but then further (unnecessary) working results in an incorrect final answer being offered.
- **RAWW** indicates right answer, wrong working.
- **R** for 'rounding error' and **PR** for 'premature rounding' resulting in a significant round-off error in the answer (if the question required evidence for rounding).
- **U** for incorrect or omitted units (if the question required evidence for units).
- **MEI** may have been used to indicate where a minor error has been made and ignored.