Assessment Schedule – 2007

Mathematics: Find and use straightforward derivatives and integrals (90286)

Evidence Statement

	Assessment Criteria	No.	Evidence	Code	Judgement	Sufficiency
ACHIEVEMENT	Find and use straightforward derivatives and integrals.	1	$f(x) = x^3 - 4x^2 + x + c$ $c = 12$ $f(x) = x^3 - 4x^2 + x + 12$ A2	A2	BOTH anti-derivative and c required. No alternative.	**ACHIEVEMENT:** TWO A including at least ONE of each of A1 and A2 **Replacement Evidence:** Qs 5, 6, 7 and 8
		2	$\frac{dy}{dx} = 3x^2 - 5$ When $x = -2$, gradient = 7	A1	BOTH derivative and value are required.	
		3	$\int_0^3 (x^2 - 2x + 4).dx$ $= [\frac{x^3}{3} - x^2 + 4x]_0^3$ $= (9 - 9 + 12) - (0)$ $= 12$	A2	BOTH integral and area required.	
		4	$\frac{dy}{dx} = 3 - \frac{1}{2}x = 3.5$ $x = -1$	A1	BOTH the derivative and x are required.	
ACHIEVEMENT WITH MERIT	Apply calculus techniques to solve straightforward problems.	5	$\frac{dV}{dh} = 9 + 0.05h$ When $h = 15$ $\frac{dV}{dh} = 9.75 \quad \frac{cm^3}{cm}$	A1 M	Units not required in any question. Derivative must be shown.	**ACHIEVEMENT WITH MERIT:** Achievement **plus** TWO M OR THREE M **Replacement Evidence:** Q 8
		6	v = -2t +c c = 18 v = -2t + 18 0 = -2t + 18 t = 9 (seconds)	A2 M	Integration needs to be shown. No alternative.	
		7	$P'(x) = 0$ $3x^2 - 24x + 36 = 0$ $x^2 - 8x + 12 = 0$ $(x - 2)(x - 6) = 0$ Minimum profit occurs When $x = 6$, $P = 3$. Profit = \$3,000. (Also acceptable: 3).	A1 M	Derivative must be shown. No alternative.	

	Apply calculus techniques to solve problems.	8	$[\frac{2x^3}{3} - \frac{3x^2}{x} - 2x]_0^2 = -4\frac{2}{3}$ $kx - 2 = 0$ $x = \frac{2}{k}$ $[\frac{kx^2}{2} - 2x]_0^{\frac{2}{k}} = -\frac{2}{k}$ $[\frac{kx^2}{2} - 2x]_{\frac{2}{k}}^{k} = 2k - 4 + \frac{2}{k}$		Accept ONE minor error in working.	**ACHIEVEMENT WITH EXCELLENCE:** Merit **plus** E
ACHIEVEMENT WITH EXCELLENCE				A2		
			Area $= 4\frac{2}{3} + (2k - 4 + \frac{2}{k}) - \frac{2}{k} = 8$	M		
			$k = \frac{11}{3}$	E	Or equivalent.	

Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
Find and use straightforward derivatives and integrals. $2 \times A$ including at least 1 each of A1 and A2.	Apply calculus techniques to solve straightforward problems. **Achievement** *plus* $2 \times M$ *or* $3 \times M$	*Apply calculus techniques to solve problems.* **Merit** *plus* Code 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 ($\wedge$).
- **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 have been 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.