Assessment Schedule – 2006

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

Evidence Statement

	Assessment Criteria	Q. No.	Evidence	Code	Judgement	Sufficiency
ACHIEVEMENT	Find and use straight-forward derivatives and integrals.	1	$\frac{dy}{dx} = 6x - 5$ When $x = 2$, gradient = 7	A1	Both derivative and value are required.	**ACHIEVEMENT:** 3 As including at least 1 of each of A1 and A2.
		2	$f(x) = 2x^4 - 5x + c$ $c = 7$ $f(x) = 2x^4 - 5x + 7$	A2	Both anti-derivative and c required. No alternative.	
		3	$\int_0^4 (12x - 3x^2).dx$ $= [6x^2 - x^3 + c]_0^4$ $= (96 - 64) - (0)$ $= 32$	A2	Both integral and area required. Ignore omission of c.	
		4	$\frac{dy}{dx} = 2x - 6 = -4$ $x = 1, y = 2$ or (1, 2)	A1	Derivative and both x and y values are required.	

ACHIEVEMENT WITH MERIT	Apply calculus techniques to solve straight-forward problems.	5	$h = \int v\,dt$ $= 2t - 0.05t^2 + c$ $c = 0$ When $t = 3$, $h = 5.55$	 A2 M	Units are not required. Or equivalent. Integral must be shown.	**ACHIEVEMENT WITH MERIT:** Achievement plus 2 Ms OR 3 Ms
		6	$\frac{dy}{dx} = -2x + 4$ At $x = 5$, $\frac{dy}{dx} = -6$ $y - 0 = -6(x - 5)$ $y = -6x + 30$	 A1 M	Units are not required.	
		7	$\int_2^6 (x^3 - 8x^2 + 12x)\,dx$ $-\int_0^2 (x^3 - 8x^2 + 12x)\,dx$ $= \left[\frac{x^4}{4} - \frac{8x^3}{3} + 6x^2 + c \right]_2^6$ $- \left[\frac{x^4}{4} - \frac{8x^3}{3} + 6x^2 + c \right]_0^2$ $= 49.3$ or $49\frac{1}{3}$	 A2 M	Units are not required. Integration needs to be shown. Do not penalise omission of c. Equivalent approaches allowed.	

ACHIEVEMENT WITH EXCELLENCE	Apply calculus techniques to solve problems.	8	Let x be width $2x$ be length h be height $3x + h = 162$ $h = 162 - 3x$ $V = x.2x.(162 - 3x)$ $= 324x^2 - 6x^3$ For max volume: $\frac{dV}{dx} = 0$ $648x - 18x^2 = 0$ $18x\,(36 - x) = 0$ $x = 36$ Hence max volume $V = 139\,968$ cm^3	 A1 M E	Units are not required. Accept a minor error in working. Or equivalent, to at least 2 significant figures.	**ACHIEVEMENT WITH EXCELLENCE:** Merit plus E

Judgement Statement

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

Achievement	Achievement with Merit	Achievement with Excellence
Find and use straightforward derivatives and integrals. $3 \times$ 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* $1 \times$ E