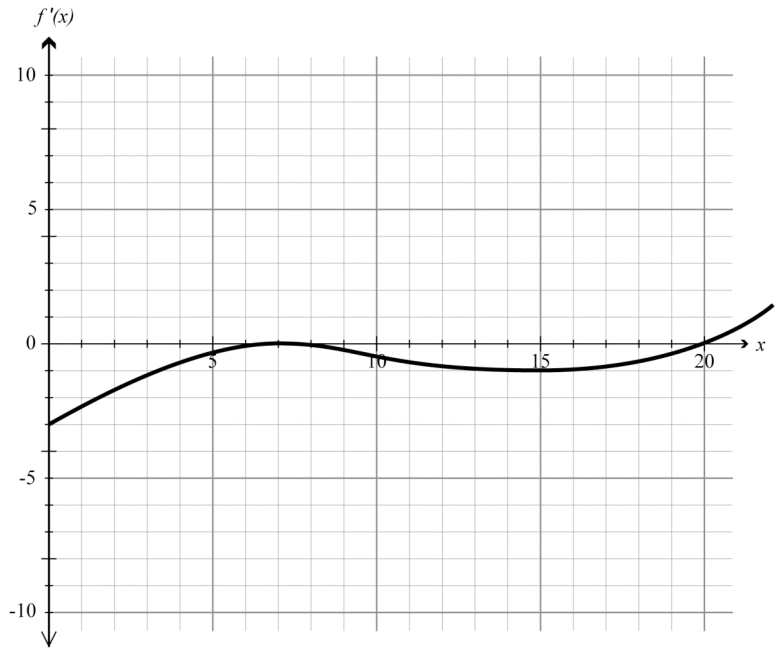
Assessment Schedule

Mathematics CAS: Demonstrate an understanding of calculus methods (90807)

	Achievement Criteria	No	Evidence	Code	Judgement	Sufficiency
ACHIEVEMENT	Demonstrate an understanding of calculus methods.	1	$\int_0^2 \left(x^2 - 2x\right)\mathrm{d}x$			Two of Code A
			$= -\frac{4}{3}$	A	CAO, must state the positive area.	
			So, Area = $\frac{4}{3}$	M		
		2(a)	$f'(x) = 1.52x^3 - 8.7x^2 + 14x - 6.1$ $f'(0.2) = -3.63584$	A	Accept any rounding CAO.	
		3	See graph below	A	Look for basic shape relevant to x values. Ignore size of y values. Through approx (0,–3) and (15,–1).	
						

MERIT	Demonstrate an understanding of a range of calculus methods.	2(b)	$m = -0.22336$ $(x_1, y_1) = (1.8, 2.076288)$ $y + 0.22336x - 1.67424 = 0$	A M	Allow reasonable rounding. Or equivalent, CAO.	Two of code M
		4	$\int_0^9 (0.09x^2 - 1.3x + 5)\mathrm{d}x$ $= 14.22$ Area = 28.44 m^2	 A M	 CAO, no alternative.	
		5(a)	$a = \frac{\mathrm{d}v}{\mathrm{d}t} = 0.03t^2 - 0.5t + 2$ when $t = 6$, $a = 0.08$ when $t = 7$, $a = -0.03$ So change in $a = -0.11$ m s^{-2}	A M	 Accept numerical error from correct values, CAO.	

EXCELLENCE	Demonstrate an understanding of a range of calculus methods in solving problems.	2(c)	tp = (0.7104173, 1.5563221) and (3.3029979, 0.2476698) length $= \sqrt{(3.3-0.71)^2+(0.25-1.6)^2}$ = 2.9 m	M E	Allow for sensible rounding.	Merit plus 1 of code E OR 2 of code E.
		5(b)	$v = \int (2t-3)\,dt$ $= t^2 - 3t + c$ when $t = 0$, $v = 4.25$ so $v = t^2 - 3t + 4.25$ Minimum when t = 1.5 $v = 2$ m s^{-1} So Jayla was wrong.	M E	Must find acceleration and comment on Jayla's statement.	
		6	Curves intersect at: (20,40) & (100,40) $\Rightarrow x_1 = 20$ and $x_2 = 100$ $A_1 = \int_{20}^{100} \left(\frac{1}{40}(x-60)^2 \right) dx$ $= \frac{3200}{3}$ $= 1066.67$ cm^2 $A_2 = \int_{20}^{100} \left(\frac{1}{80}(x-60)^2 + 20 \right) dx$ $= \frac{6400}{3}$ $= 2133.33$ cm^2 Area = 2133.33 – 1066.67 = 1066.67 cm^2	A A EM		

Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate an understanding of calculus methods. $2 \times$ A	Demonstrate an understanding of a range of calculus methods. $2 \times$ M	Demonstrate an understanding of a range of calculus methods in solving problems. Achievement with Merit plus $1 \times$ E OR $2 \times$ 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 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.