Question	Answer	Marks	Partial Marks
7(a)	$\ln y = \ln(Ax^n)$ and so $\ln y = \ln A + \ln x^n$	**M1**	
	$\ln y = \ln A + n \ln x$	**A1**	
7(b)	$\ln A = 0.5$	**M1**	
	$A = e^{0.5}$ or 1.6	**A1**	
	$n = \dfrac{1.7 - 0.5}{3.2 - 0}$	**M1**	
	$n = \dfrac{3}{8}$ oe	**A1**	
7(c)	$y = their\, e^{0.5} (11)^{their \frac{3}{8}}$ oe	**M1**	
	4.05 or 4.05200... rot to four or more figs	**A1**	
8(a)	$\sec^2(x+4) - 3\cos x$	**B2**	**B1** for each
8(b)	$\dfrac{d(\ln(2x+5))}{dx} = \dfrac{2}{2x+5}$	**B1**	
	$\dfrac{d(2e^{3x})}{dx} = 6e^{3x}$	**B1**	
	$\dfrac{dy}{dx} =$ $\dfrac{2e^{3x}\left(their \dfrac{2}{2x+5}\right) - their 6e^{3x} \ln(2x+5)}{4e^{6x}}$	**M1**	**FT** *their* derivatives of $\ln(2x+5)$ and $2e^{3x}$
	$\dfrac{dy}{dx} =$ $\dfrac{2e^{3x}\left(\dfrac{2}{2x+5}\right) - 6e^{3x} \ln(2x+5)}{4e^{6x}}$	**A1**	
	$\delta y = their \left.\dfrac{dy}{dx}\right\|_{x=1} \times h$	**M1**	
	$-0.138h$	**A1**	
9(a)	–540	**B2**	**B1** for $\dfrac{6\times5\times4}{3!}(3x)^3\left(-\dfrac{1}{x}\right)^3$ oe

Question	Answer	Marks	Partial Marks
9(b)	$\frac{n(n-1)(n-2)(n-3)(n-4)(n-5)}{6!}\times\left(\frac{1}{2}\right)^6$	**B1**	
	$\frac{n(n-1)(n-2)(n-3)}{4!}\times\left(\frac{1}{2}\right)^4$	**B1**	
	Forms a correct equation with *their* coefficients in terms of n	**M1**	
	Simplifies their equation to $(n-4)(n-5)=240$ or better	**M1**	
	Factorises or attempts to solve *their* 3-term quadratic	**M1**	
	$n=20$	**A1**	
10(a)	$5(1+\tan^2 A)+14\tan A-8=0$ soi	**B1**	
	Solves or factorises *their* 3-term quadratic in tan$A$ oe	**M1**	
	11.3 and 108.4 or 11.30[99...] and 108.43[49...] rot to four or more decimal places	**A2**	with no extras in range; not from clearly wrong working but allow recovery from minor slips or **A1** for either, ignoring extras
10(b)	$4B-\frac{\pi}{8}=\sin^{-1}\left(-\frac{2}{5}\right)$ soi	**B1**	
	–0.411[516...] rot to three or more figs	**M1**	
	–0.00470[444...] rot to three or more figs	**A1**	
	–0.584[344...] rot to three or more figs	**A1**	
11(a)	$R=\frac{1}{2}(w+180)$	**B1**	
	$V=\frac{1}{3}\pi(\textit{their } R)^2(w+180)$ $-\frac{1}{3}\pi(90)^2(180)$	**M1**	
	Correct completion to given answer: $V=\frac{\pi}{12}(w+180)^3-486000\pi$	**A1**	