Question	Answer	Marks	Guidance
4(a)	$n = 5$	**B1**	
	$5 \times 3^4 p = 810$	**M1**	For considering the second term. Allow for use of *their n*
	$p = 2$	**A1**	
	$10 \times 3^3 \times p^2 = q$	**M1**	For considering the third term. Allow for use of *their n* and p^2
	$q = 1080$	**A1**	
4(b)	${}^6C_2 (2y)^4 \left((-)\frac{1}{3y^2} \right)^2$	**M1**	For identifying the correct term. Condone errors with brackets and coefficients. Could be implied by a correct answer
	$\frac{80}{3}$ oe	**A1**	Must be exact. Allow $\frac{240}{9}$ or $26\frac{2}{3}$
5(a)	$a = 5,\ b = \frac{3}{4}$ (oe), $c = -4$	**3**	**B1** for each
5(b)	$[p =]1,\ [p =]5$	**2**	**B1** for each Do not allow if written as inequalities
6	$\ln(2x - 3)$	**B1**	Allow unsimplified
	$\frac{1}{3x - 5}$ oe	**B1**	
	$\ln 5 + \frac{1}{7} - 1$	**M1**	For correct application of limits in *their* integral, Must be in the correct form $a \ln(2x - 3) \pm \frac{b}{3x - 5}$
	$\ln 5 - \frac{6}{7}$ cao	**A1**	

© Cambridge University Press & Assessment 2024

Question	Answer	Marks	Guidance
7	Use of $\cot^2\theta + 1 = \text{cosec}^2\theta$ and $\text{cosec}\,\theta = \frac{1}{\sin\theta}$	**B1**	$4 + \cot^2\theta = 9x^2$ gets **B0 M0 A0** unless recovered
	$(3x-2)^2 + 1 = \left(\frac{1}{y}\right)$ oe	**M1**	
	$y = \frac{1}{(3x-2)^2+1}$ oe	**A1**	
	Alternative Method: Use of $\cot\theta = \frac{\cos\theta}{\sin\theta}$ leading to $y = \frac{\cos^2\theta}{(3x-2)^2}$ oe	**M1**	For use of the identity to substitute $\cot\theta$ to get $2 + \frac{\cos\theta}{\sqrt{y}} = 3x$ **and** rearranging to get $y = \frac{\cos^2\theta}{(3x-2)^2}$
	Use $\sin^2\theta + \cos^2\theta = 1$ to get $y = \frac{1-y}{(3x-2)^2}$ oe	**M1**	For use of the identity to substitute $\cos^2\theta$ to get $y = \frac{1-\sin^2\theta}{(3x-2)^2}$ **and** use of $\sin^2\theta = y$
	$y = \frac{1}{(3x-2)^2+1}$ oe	**A1**	
8	$\sin\left(2\alpha - \frac{\pi}{3}\right) = (\pm)\frac{1}{2}$	**B1**	Condone if ± is missing for this mark
	$\alpha = -\frac{5\pi}{12}, -\frac{\pi}{4}, \frac{\pi}{12}, \frac{\pi}{4}$ oe in terms of π	**4**	**M1** for correct attempt to obtain one solution using correct order of operations **A3** for 4 correct solutions and no extras in the range, or **A2** for 3 correct solutions or **A1** for 2 correct solutions
9(a)	For use of $e^0 = 1$ or $\ln 1 = 0$	**B1**	
	$4x - y\,(=0)$	**B1**	For simplifying powers of e leading to a linear equation in x and y
	$4x^3 = 256$ or $\frac{y^3}{16} = 256$	**M1**	For attempt to obtain a cubic equation in one variable using *their* linear $4x - y = 0$ with an attempt to solve
	$x = 4,\ y = 16$	**2**	**A1** for each **A0** for $y = \pm 16$

© Cambridge University Press & Assessment 2024