Question	Answer	Marks	Guidance
1	$\pm 3(x+4)(2x-1)(x-2)$	**3**	**B1** for $\pm$ **B1** for 3, may be implied by a linear factor **B1** for $(x+4)(2x-1)(x-2)$ and no extra terms; may be implied if 3 is included
2(a)	$2^{8(x+y)} \times 2^{4(-2x)} = 2^{3(-x+3y)}$	**M1**	For attempt at a common factor, must have at least one correct
	$y = 3x$	**A1**	Must show sufficient detail
2(b)	$x^2 + 3(9x^2) = 56$ or $\frac{y^2}{9} + 3y^2 = 56$	**M1**	For obtaining an equation in terms of one variable using *their* $y = 3x$ with attempt to solve to obtain $x =$, or $y =$
	$x = \sqrt{2},\ y = 3\sqrt{2}$ or exact equivalent $x = -\sqrt{2},\ y = -3\sqrt{2}$ or exact equivalent	**2**	**A1** for a correct pair
3	$b = \frac{3}{8}$	**B1**	
	$6 = a + c$ or $0 = -\frac{a}{2} + c$	**M1**	For using either intercept with *their b*
	$c = 2$	**A1**	
	$a = 4$	**A1**	
4	$\ln(4x+3)$	**B1**	
	$2\ln(8a+7) - 2\ln(3)\ \ (= \ln 16)$	**M1**	**Dep** for correct application of limits in *their* $k\ln(4x+3)$
	$(2)\ln\frac{8a+7}{3}$ oe	**M1**	**Dep** for use of division rule
	$\ln 16 = 2\ln 4$ oe	**B1**	
	$a = \frac{5}{8}$ only	**A1**	
5(a)	${}^{15}C_3 k^3 = -29120$ oe	**M1**	
	$k = -4$	**A1**	

© Cambridge University Press & Assessment 2024

Question	Answer	Marks	Guidance
5(b)	$^{12}C_8\left(8y^2\right)^4\left(-\frac{1}{2y}\right)^8$ or $^{12}C_4\left(8y^2\right)^4\left(-\frac{1}{2y}\right)^8$	**M1**	
	7920	**A1**	
6	$b=12$	**2**	**M1** for attempt at differentiation
	$-27a+99-3b+c=0$ $a+11+b+c=16$	**2**	**M1** for attempt at $\mathrm{p}(-3)=0$ or $\mathrm{p}(1)=16$
	$a=2$ $c=-9$	**2**	**M1** for attempt to solve *their* equations
7(a)	$\mathrm{e}^{5y}=mx^3+c$ soi	**B1**	
	$4.38=-2.56m+c$ $9.84=6.54m+c$	**M1**	Must be using the coordinates correctly
	$m=0.6,\ c=5.92$	**2**	**M1 dep** for solution of *their* equations
	$y=\frac{1}{5}\ln\left(0.6x^3+5.92\right)$	**A1**	
	Alternative		
	$\mathrm{e}^{5y}=mx^3+c$ soi	**B1**	
	Gradient = $\frac{5.46}{9.1}\ (=m)$	**M1**	Must be using the coordinates correctly
	$4.38=-2.56m+c$ or $9.84=6.54m+c$	**M1**	Must be using the coordinates correctly
	$m=0.6,\ c=5.92$	**A1**	
	$y=\frac{1}{5}\ln\left(0.6x^3+5.92\right)$	**A1**	
7(b)	$0.6x^3+5.92>0$	**M1**	Allow use of *their* $\frac{1}{5}\ln\left(0.6x^3+5.916\right)$
	$x>-2.14$	**2**	**M1 dep** for a correct method of solution to obtain $x>\ldots$

© Cambridge University Press & Assessment 2024