<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Partial Marks</th></tr>
<tr><td rowspan="4">6(b)</td><td>Factorises:
$\tan x\left(\cos^2 x-\frac{1}{2}\right)=0$ oe or
$\tan x\left(\frac{1}{2}-\sin^2 x\right)=0$ oe or
correctly rewrites and then factorises:
$\sin x\left(\cos^2 x-\frac{1}{2}\right)=0$ oe or
$\sin x\left(\frac{1}{2}-\sin^2 x\right)=0$ oe or
$\tan x\left(1-\tan^2 x\right)=0$ oe</td><td>M1</td><td>Note: division by tanx is M0

Note: division by sinx is M0</td></tr>
<tr><td>[tanx = 0 or sinx = 0] [x =] 0</td><td>A1</td><td></td></tr>
<tr><td>cosx = [±]$\sqrt{\frac{1}{2}}$ oe or
sinx = [±]$\sqrt{\frac{1}{2}}$ oe or
tan x = [±]1</td><td>M1</td><td>nfww</td></tr>
<tr><td>[x =]
$\pm\frac{\pi}{4}$ or ± 0.785 or ± 0.7853 to ± 0.7854,

$\pm\frac{3\pi}{4}$ or ± 2.36 or ± 2.356 to ± 2.3562</td><td>A2</td><td>with no extras in range; nfww

A1 for any two out of four correct, ignoring extras</td></tr>
<tr><td>7(a)</td><td>282 240</td><td>2</td><td>M1 for 9! – 2! × 8! oe</td></tr>
<tr><td>7(b)</td><td>120</td><td>2</td><td>M1 for 5! or $^5P_5$ oe</td></tr>
<tr><td>8(a)</td><td>Points plotted at
<table><tr><td>x</td><td>15</td><td>30</td><td>45</td><td>60</td><td>75</td></tr><tr><td>lny</td><td>2.3</td><td>2.5 or 2.6</td><td>3.1</td><td>3.5 or 3.6</td><td>3.9</td></tr></table>soi
and
single, ruled, straight line of best fit drawn</td><td>B2</td><td>B1 for at least 4 correctly plotted points</td></tr>
</table>

© Cambridge University Press & Assessment 2024

Question	Answer	Marks	Partial Marks
8(b)	$\ln y = 0.03x + 1.8$	**2**	**M1** for m = awrt 0.02 to awrt 0.03 or c = awrt 1.7 to awrt 2.0 or for the straight line form in terms of $\ln A$ and k: $\ln y = \ln A + kx$[lne]
	$A = 6$ or $A = 7$ and $k = 0.03$ or $k = 0.02$	**B3**	Must have been found using linear points **or** linear equation **B2** for $A = 6$ or $A = 7$ or A in range: awrt 6 or awrt 7 or **B1 FT** for $\ln A =$ *their* 1.8 or $A = e^{\textit{their}1.8}$ and **B1 FT** for $k = 0.03$ or 0.02 or k in range: awrt 0.02 or awrt 0.03 **Maximum of 2 marks if one or both values not rounded to 1 sf** If **B0** scored, award **SC1** for $A = 6$ or $A = 7$ and **SC1** for $k = 0.03$ or $k = 0.02$ found not using transformed data

© Cambridge University Press & Assessment 2024

Question	Answer	Marks	Partial Marks
8(c)	A value of x in range $33 \leqslant x \leqslant 37.5$ nfww, isw	**2**	**M1** for $\ln y = 2.8$ or 2.83[32...] OR A value of x in range $29.5 \leqslant x < 33$ or $37.5 < x \leqslant 45$ nfww OR **M1 STRICT FT** for $x = \dfrac{\ln 17 - \textit{their} \ln A}{\textit{their } k}$ **STRICT FT** *their* stated ln$A$ and *their* stated k or *their* stated linear equation in **(b)** OR $x = \dfrac{1}{\textit{their } k} \ln\left(\dfrac{17}{\textit{their} A}\right)$ **STRICT FT** *their* stated A and *their* stated k or *their* stated exponential equation in **(b)**

Question	Answer	Marks	Partial Marks
9	$A(2, 0)$ or $x = 2$ [$x = 6$]	**2**	**M1** for factorising or solving $32x - 4x^2 - 48 = 0$
	Finds equation CD/ x-coordinate of C or D or maximum point : $x = 4$	**2**	**M1** for $\frac{2+6}{2}$ or $32 - 8x = 0$
	$D(4, 8)$ or [equation AB is $y =$] $4x - 8$	**2**	**M1** for $y = \frac{2}{3}\times 12$ or $m_{AB} = \frac{12-0}{5-2}$ soi
	$\left[\frac{32}{2}x^2 - \frac{4}{3}x^3 - 48x\right]_2^4$ or $\left[\frac{28}{2}x^2 - \frac{4}{3}x^3 - 40x\right]_2^4$	**B1**	**must be seen**
	Correct plan **including** correct substitution of upper and lower limits at some point e.g. $\left[16x^2 - \frac{4}{3}x^3 - 48x\right]_2^{their4} - \frac{1}{2}\times(their4 - 2)\times their8$ or $\left[16x^2 - \frac{4}{3}x^3 - 48x\right]_2^{their4} - [2x^2 - 8x]_2^{their4}$ or $\left[14x^2 - \frac{4}{3}x^3 - 40x\right]_2^{their4}$	**M1**	**dep** on attempt to integrate **FT** *their* 4 and *their* 8 if needed or **FT** *their* 4 and *their* $4x - 8$ of the form $mx + c$ if needed or **FT** *their* 4 and $(32 - their4)x - 4x^2 + (-48 - their(-8))$ providing clear evidence of the derivation of this has been seen
	$\frac{40}{3}$ isw or 13.3[33….] **nfww**	**A1**	**dep on all previous marks awarded**
10(a)	Valid explanation using f: f is one-one oe	**B1**	
10(b)	Complete method to find inverse function: Swaps the variables and rearranges or rearranges and swaps the variables	**M1**	Condone one sign or arithmetic error but must have the correct order of operations
	$\left[f^{-1}(x) =\right] -\sqrt{\ln x - 3}$ isw or $\left[f^{-1}(x) =\right] -\sqrt{\ln\frac{x}{e^3}}$ oe isw	**A2**	**A1** for $\left[f^{-1}(x) =\right]$ $[\pm]\sqrt{\ln x - 3}$ or $\left[f^{-1}(x) =\right]$ $[\pm]\sqrt{\ln\frac{x}{e^3}}$ oe
	Domain f^{-1}: $x > e^3$	**B1**	
	Range f^{-1}: $f^{-1} < 0$	**B1**	

© Cambridge University Press & Assessment 2024