Question	Answer	Marks	Partial marks
4	$(2+ax)^5 = 2^5 + 5\times 2^4 ax + 10\times 2^3 a^2x^2 + ...$	**B1**	
	$(2+ax)^5(1+bx) =$ $32 + 80ax + 80a^2x^2 + 32bx + 80abx^2...$	**M1**	
	$80a + 32b = 112$ oe, isw	**A1**	
	$80a^2 + 80ab = -240$ oe, isw	**A1**	
	$3a^2 - 7a - 6 = 0$ oe	**M1**	
	$(3a + 2)(a - 3) = 0$	**M1**	
	$a = 3$ and $b = -4$ and no other values	**A1**	
5	$[m_{\text{tangent}} =] -2px^{-3} + 5$ oe	**B1**	
	[When $x = 1$, $m_{\text{normal}} =$] $\frac{-1}{-2p+5}$ or gradient of tangent = 1 nfww	**B1**	**FT** $\frac{-1}{their \left.\frac{dy}{dx}\right\|_{x=1}}$ if appropriate
	$\frac{-1}{their(-2p+5)} = -1$ oe or *their*$(-2p + 5) = 1$	**M1**	**FT** $\frac{-1}{their \left.\frac{dy}{dx}\right\|_{x=1}}$ or *their* $\left.\frac{dy}{dx}\right\|_{x=1}$ and *their* evaluation of $\frac{-1}{-1}$
	$p = 2$ nfww	**A1**	
	[When $x = 1$] *their* $5 = -1 + q$ or $y = -x + 6$	**M1**	**FT** $y =$ (*their p*) + 3 providing at least 2 of the first 3 marks awarded
	$q = 6$ nfww	**A1**	
6	$ax^2 - 5x + 2 = 2ax + x - 10$	**M1**	
	$ax^2 - (2a+6)x + 12[=0]$ oe	**A1**	
	Correct use of $b^2 - 4ac$ [*0]: $(-(2a + 6))^2 - 4(a)(12)$ [*0] oe	**M1**	where * is any inequality sign or =; **FT** *their* 3-term quadratic in x and a
	$4a^2 - 24a + 36$ [*0]	**A1**	
	Factorises or solves *their* 3-term quadratic in a	**M1**	**FT** *their* 3-term quadratic in a
	$a = 3$	**A1**	

Question	Answer	Marks	Partial marks
6	**Alternative method**		
	$a = \frac{3}{x-1}$ oe or $x = \frac{a+3}{a}$	**(2)**	**M1** for $2ax - 5$
	$\left(\frac{6}{x-1}+1\right)x-10=\left(\frac{3}{x-1}\right)x^2-5x+2$ oe or $(2a+1)\left(\frac{a+3}{a}\right)-10=a\left(\frac{a+3}{a}\right)^2-5\left(\frac{a+3}{a}\right)+2$ oe	**(M1)**	**FT** *their a* of the form $\frac{k}{bx+c}$ where *k*, *b*, *c* are non-zero constants or *their x* of the form $\frac{da+e}{fa}$ where *d*, *e*, *f* are non-zero constants
	$3x^2 - 12x + 12$ [= 0] oe or $a^2 - 6a + 9$ [= 0]	**(A1)**	
	Solves *their* 3-term quadratic in *x* as far as *x* = ... or factorises or solves *their* 3-term quadratic in *a*	**(M1)**	
	$a = 3$	**(A1)**	
7(a)	$20\cos 2t + 12\sin 2t$	**2**	**B1** for $20\cos 2t$ or $12\sin 2t$
7(b)	12	**B1**	
7(c)	$\tan 2t = their\left(-\frac{20}{12}\right)$ oe	**M1**	**FT** $a\cos 2t + b\sin 2t$ where *a* and *b* are non-zero integers
	$t = 1.06$ or $1.055[60\ldots]$ rot to 3 or more dp	**A2**	**A1** for $2t = -1.030[3\ldots]$ or $2t = 2.111[2\ldots]$
7(d)	$s = -5\cos 2t - 3\sin 2t$ (+ *c*)	**B2**	**B1** for $-5\cos 2t$ or $-3\sin 2t$
	$-5\cos\pi - 3\sin\pi - (-5\cos\frac{\pi}{2} - 3\sin\frac{\pi}{2})$ or $s = -5\cos 2t - 3\sin 2t + 5$ and $s_{\frac{\pi}{2}} - s_{\frac{\pi}{4}} = 10 - 2$	**M1**	**FT** providing at least **B1** previously awarded
	8	**A1**	