4722 Core Mathematics 2

		Mark	Total	
1	area of sector = ½ x 11^2 x 0.7 = 42.35 area of triangle = ½ x 11^2 x sin0.7 = 38.98 hence area of segment = 42.35 – 38.98 = 3.37	M1 A1 M1 A1	4	Attempt sector area Obtain 42.35, or un Attempt triangle ar subtract from attem Obtain 3.37, or bett
			4	
2	area $\approx \frac{1}{2}\times 2\times\left\{2+2\left(\sqrt{12}+\sqrt{28}\right)+\sqrt{52}\right\}$ ≈ 26.7	M1 M1 M1 A1	4	Attempt y-values at Correct trapezium r find area between x Correct h (soi) for t Obtain 26.7 or bette
			4	
3 (i)	$\log_a 6$	B1	1	State $\log_a 6$ cwo
(ii)	$2\log_{10} x-3\log_{10} y=\log_{10} x^2-\log_{10} y^3$ $=\log_{10}\frac{x^2}{y^3}$	M1* M1dep* A1	3	Use $b \log a = \log a^b$ Use $\log a - \log b =$ Obtain $\log_{10}\frac{x^2}{y^3}$
			4	
4 (i)	$\frac{BD}{\sin 62}=\frac{16}{\sin 50}$ BD = 18.4 cm	M1 A1	2	Attempt to use corr Obtain 18.4 cm
(ii)	$18.4^2 = 10^2 + 20^2 - 2$ x 10 x 20 x cos θ cos θ = 0.3998 $\theta = 66.4^0$	M1 M1 A1	3	Attempt to use corr Attempt to rearrang (from $a^2 = b^2 + c$ Obtain 66.4^0
			5	
5	$\int 12x^{\frac{1}{2}}dx = 8x^{\frac{3}{2}}$	M1		Attempt to integrate

			Mark	Total	
6	(i)	$u_1 = 7$	B1		Correct u_1
		$u_2 = 9$, $u_3 = 11$	B1	2	Correct u_2 and u_3
	(ii)	Arithmetic Progression	B1	1	Any mention of a
	(iii)	$\frac{1}{2} N (14 + (N - 1) \times 2) = 2200$	B1		Correct interpreta
			M1		Attempt sum of A
		$N^2 + 6N - 2200 = 0$	A1		Correct (unsimpli
		$(N - 44)(N + 50) = 0$	M1		Attempt to solve
		hence $N = 44$	A1	5	Obtain $N = 44$ on
				8	
7	(i)	Some of the area is below the x-axis	B1	1	Refer to area / cu area'...
	(ii)		M1		Attempt integrati
			A1		Obtain $^1/_3x^3 - {}^3/_2x$
		$\left[\frac{1}{3}x^3 - \frac{3}{2}x^2\right]_0^3 = \left(9 - \frac{27}{2}\right) - (0 - 0)$	M1		Use limits 3 (and
		$= -4\frac{1}{2}$	A1		Obtain (-)4½
		$\left[\frac{1}{3}x^3 - \frac{3}{2}x^2\right]_3^5 = \left(\frac{125}{3} - \frac{75}{2}\right) - \left(9 - \frac{27}{2}\right)$	M1		Use limits 5 and
		$= 8\frac{2}{3}$	A1		Obtain $8^2/_3$ (allov
		Hence total area is $13^1/_6$	A1	7	Obtain total area
					SR: if no longer ∫ [0, 3] and [3, 5]
				8	
8	(i)	$u_4 = 10 \times 0.8^3$	M1		Attempt u_4 using
		$= 5.12$	A1	2	Obtain 5.12 aef
	(ii)	$S_{20} = \frac{10(1 - 0.8^{20})}{1 - 0.8}$	M1		Attempt use of co
		$= 49.4$	A1	2	Obtain 49.4
	(iii)	$\frac{10}{1 - 0.8} - \frac{10(1 - 0.8^N)}{(1 - 0.8)} < 0.01$	M1		Attempt S_∞ using
			A1		Obtain $S_\infty = 50$, o

			Mark	Total	
9	(i)	$(90^\circ, 2), (-90^\circ, -2)$	B1		State at least 2 co
			B1	2	State all 4 correct (radians is B1 B0
	(ii)	(a) $180 - \alpha$	B1	1	State $180 - \alpha$
		(b) $-\alpha$ or $\alpha - 180$	B1	1	State $-\alpha$ or $\alpha - 18$ (radians or unsim
	(iii)	$2\sin x = 2 - 3\cos^2 x$			
		$2\sin x = 2 - 3(1 - \sin^2 x)$	M1		Attempt use of co
		$3\sin^2 x - 2\sin x - 1 = 0$	A1		Obtain $3\sin^2 x - 2$
		$(3\sin x + 1)(\sin x - 1) = 0$	M1		Attempt to solve
		$\sin x = -{}^1/_3$, $\sin x = 1$	A1		Obtain $x = -19.5^\circ$
		$x = -19.5^\circ, -161^\circ, 90^\circ$	A1√		Obtain second co their x
			A1	6	Obtain 90° (radian
					SR: answer only
				10	
10	(i)	$(2x + 5)^4 = (2x)^4 + 4(2x)^3 5 + 6(2x)^2 5^2 + 4(2x)5^3 + 5^4$	M1*		Attempt expansio (at least 4 terms)
		$= 16x^4 + 160x^3 + 600x^2 + 1000x + 625$	M1*		Attempt coefficie
			A1dep*		Obtain two correc
			A1	4	Obtain a fully cor
	(ii)	$(2x + 5)^4 - (2x - 5)^4 = 320x^3 + 2000x$	M1		Identify relevant t change oe
			A1	2	Obtain $320x^3 + 20$
	(iii)	$9^4 - (-1)^4 = 6560$ and $7360 - 800 = 6560$ **A.G.**	B1		Confirm root, at a
		$320x^3 - 1680x + 800 = 0$	M1		Attempt complete
		$4x^3 - 21x + 10 = 0$	A1√		Obtain quotient o their coeff of x^3
		$(x - 2)(4x^2 + 8x - 5) = 0$	A1		Obtain $(4x^2 + 8x$
		$(x - 2)(2x - 1)(2x + 5) = 0$	M1		Attempt to solve
		Hence $x = ½$, $x = -2½$	A1	6	Obtain $x = ½$, $x =$
					SR: answer only
				12	