

Q	Marking instructions	AO	Marks	Typical solution
14(a)(i)	Obtains $2^x \ln 2$ Or $\ln 2 e^{x \ln 2}$	1.2	B1	$\frac{dy}{dx} = 2^x \ln 2$
Subtotal			1	

Q	Marking instructions	AO	Marks	Typical solution
14(a)(ii)	Integrates to obtain $k2^x$, $k \neq 1$ or 0 OE	1.1a	M1	$\int 2^x dx = \frac{2^x}{\ln 2} + c$
	Deduces $\int 2^x dx = \frac{2^x}{\ln 2} + c$ OE Must include +c	2.2a	R1	
Subtotal			2	

Q	Marking instructions	AO	Marks	Typical solution
14(b)(i)	Obtains $2^{-\frac{1}{2}}$ Exact value ACF	1.1a	M1	$\frac{1}{2} \times \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{4}$
	Writes the product $0.5 \times 2^{-\frac{1}{2}}$ in exact form ACF to obtain given answer. Condone $-0.5 \times 2^{-\frac{1}{2}}$ if reason given for rejecting the negative sign	2.1	R1	
Subtotal			2	

Q	Marking instructions	AO	Marks	Typical solution
14(b)(ii)	<p>Uses $S_n = \frac{a(1-r^n)}{1-r}$</p> <p>With at least two of $a = \frac{\sqrt{2}}{4}$,</p> <p>$r = \frac{\sqrt{2}}{2}$ and $n = 8$ correct</p> <p>Or</p> <p>with at least two of $a = \frac{1}{32}$,</p> <p>$r = \sqrt{2}$ and $n = 8$ correct</p> <p>Or</p> <p>Forms the sum of 8 rectangles using</p> $\frac{1}{2} \left(\frac{1}{\sqrt{2}} + \frac{1}{2} + \frac{1}{2\sqrt{2}} + \frac{1}{4} + \frac{1}{4\sqrt{2}} + \frac{1}{8} + \frac{1}{8\sqrt{2}} + \frac{1}{16} \right)$ <p>OE</p> <p>with at least 4 correct terms</p>	1.1a	M1	$\frac{\frac{\sqrt{2}}{4} \left(1 - \left(\frac{\sqrt{2}}{2} \right)^8 \right)}{1 - \frac{\sqrt{2}}{2}}$ $= \frac{15 + 15\sqrt{2}}{32}$ $= \frac{15}{32} (1 + \sqrt{2})$
	Obtains a correct expression can be left unsimplified.	1.1b	A1	
	<p>Obtains $\frac{15(1+\sqrt{2})}{32}$ or</p> $\frac{15}{32}(1+\sqrt{2})$ <p>Do not award value of k is just stated without either of these answers.</p>	2.1	R1	
	Subtotal		3	

Q	Marking instructions	AO	Marks	Typical solution
14(b)(iii)	Forms the definite integral $\int_{-4}^0 2^x dx$ PI by $\frac{1}{\ln 2} [2^x]_{-4}^0$ Condone swapped limits and missing dx PI by AWRT ± 1.35	3.1a	M1	$\int_{-4}^0 2^x dx = \frac{1}{\ln 2} [2^x]_{-4}^0$ $= \frac{1}{\ln 2} (2^0 - 2^{-4})$ $= \frac{15}{16 \ln 2}$
	Substitutes 0 and -4 correctly into the correct integrated expression Or Obtains AWRT 1.35	1.1b	A1	
	Obtains correct exact value ACF	1.1b	A1	
	Subtotal		3	

	Question 14 Total		11	
--	--------------------------	--	-----------	--