Q	Marking instructions	AO	Marks	Typical solution
7(a)(i)	Forms a correct expression for the gradient or sets up two correct simultaneous equations PI by $a = -0.7$ or $b = 1.5$ Ignore missing labels	1.1a	M1	$\frac{4.49-1.94}{3.46-1.76}=1.5$ $\log_{10} T - 1.94 = 1.5(\log_{10} d - 1.76)$ $\log_{10} T = -0.7 + 1.5\log_{10} d$
	Obtains $a = -0.7$ or $b = 1.5$ OE Ignore missing labels	1.1b	A1	
	Obtains $a = -0.7$ and $b = 1.5$ or seen in the logarithmic equation ISW	1.1b	A1	
	Subtotal		**3**	

Q	Marking instructions	AO	Marks	Typical solution
7(a)(ii)	Uses one law of logarithm correctly Allow use of original equation without values for a and b If values are used, $a \neq 0$	3.3	M1	$\log_{10} T - \log_{10} d^{1.5} = -0.7$ $\log_{10}\left(\frac{T}{d^{1.5}}\right) = -0.7$
	Completes reasoned argument to obtain $T = Kd^n$ with $K = 10^{-0.7}$ or AWRT 0.2 and $n = 1.5$ ISW Must come from correct working	2.1	R1	$\frac{T}{d^{1.5}} = 10^{-0.7}$ $T = 10^{-0.7} \times d^{1.5}$
	Subtotal		**2**	

Q	Marking instructions	AO	Marks	Typical solution
7(b)	Forms an equation using their answer to **(a)(ii)** with K > 0 and $n > 0$ and $T = 60000$ Must only have unknown d in the equation	3.4	M1	$60000 = 0.2 \times d^{1.5}$ $d = 4488.5$ Average distance is approximately 4500 million kilometres
	Obtains AWRT 4500 million kilometres ACF with units For example • 4.5×10^9 **kilometres** • 4500×10^6 **kilometres** • 4.5×10^{12} **metres** • 4500×10^9 **metres**	3.2a	A1	
	Subtotal		**2**	

	Question 7 Total		**7**	