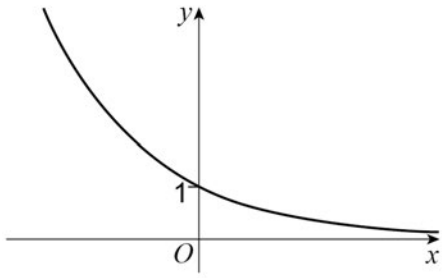
Q	Marking instructions	AO	Marks	Typical solution
7(a)	Draws an approximate negative exponential graph in both quadrants	1.1a	M1	
	Draws the fully correct graph, with y-intercept correctly labelled	1.1b	A1	
	Subtotal		**2**	

Q	Marking instructions	AO	Marks	Typical solution
7(b)(i)	Differentiates 2^{-x} to obtain $A \times 2^{-x}$ Where A is a constant **and** $A \neq \pm 1$	1.1a	M1	$f'(x) = 2^{-x} \ln 2$ $(\ln 2)2^{-x} > 0$ So $f'(x) = 2^{-x} \ln 2 > 0$ Hence the function is increasing.
	Obtains only $2^{-x} \ln 2$ ACF	1.1b	A1	
	Completes reasoned argument to show that f is increasing. Must state $2^{-x} > 0$ and conclude f is an increasing function Accept $2^{-x} \geq 0$	2.1	R1	
	Subtotal		**3**	

Q	Marking instructions	AO	Marks	Typical solution
7(b)(ii)	Writes the correct range ACF. For example: y < 5 $(-\infty, 5)$	2.2a	B1	$f(x) < 5$
	Subtotal		**1**	

Q	Marking instructions	AO	Marks	Typical solution
7(b)(iii)	Isolates the exponential term. The exponent could be $-x$ or $-y$ Condone one sign error	1.1a	M1	$2^{-x} = 5 - y$ $-x = \log_2(5-y)$ $x = -\log_2(5-y)$ $f^{-1}(x) = -\log_2(5-x)$
	Takes logs correctly to any base of both sides of their equation with an isolated exponent term. For example: $\log_a 2^{-x} = \log_a 5 - y$ or $-x \log_a 2 = \log_a(5-y)$	1.1a	M1	
	Obtains a correct expression for $f^{-1}(x)$ in terms of x	2.1	R1	

	Ignore any reference to domain or range			
	Subtotal		**3**	

Q	Marking instructions	AO	Marks	Typical solution
7(b)(iv)	Obtains $x < 5$ FT their restricted range from **(b)(ii)** written as a domain in terms of x	2.2a	B1F	$x < 5$
	Subtotal		**1**	

	Question 7 Total		**10**	