(12) (a) $f(5-x)$

$$= \frac{1}{\sqrt{5-x}}$$

(b) Undefined when:

$$5 - x \leq 0$$

$$-x \leq -5$$

$$x \geq 5$$

Question			Generic scheme	Illustrative scheme	Max mark
12.			**Method 1** •1 state linear equation •2 introduce logs •3 use laws of logs •4 use laws of logs •5 state a and b	**Method 1** •1 $\log_4 y = 3x-1$ •2 $\log_4 y = 3x\log_4 4 - \log_4 4$ •3 $\log_4 y = \log_4 4^{3x} - \log_4 4$ •4 $\log_4 y = \log_4\left(\frac{4^{3x}}{4}\right)$ or $\log_4 y = \log_4 4^{-1}4^{3x}$ •5 $a = \frac{1}{4},\ b = 64$	**5**
			Method 2 •1 state linear equation •2 convert to exponential form •3 use laws of indices •4 state a •5 state b	**Method 2** •1 $\log_4 y = 3x-1$ •2 $y = 4^{3x-1}$ •3 $y = 4^{-1}4^{3x}$ •4 $a = \frac{1}{4}$ •5 $b = 64$	**5**
			Method 3 •1 introduce logs to $y = ab^x$ •2 use laws of logs •3 interpret intercept •4 interpret gradient •5 state a and b	**Method 3** **The equations at •1, •2, •3 and •4 must be stated explicitly.** •1 $\log_4 y = \log_4 ab^x$ •2 $\log_4 y = \log_4 a + x\log_4 b$ •3 $-1 = \log_4 a$ •4 $3 = \log_4 b$ •5 $a = \frac{1}{4},\ b = 64$	**5**

Question	Generic scheme	Illustrative scheme	Max mark
	Method 4	**Method 4**	**5**
	•1 interpret point on log graph	•1 $x=3$ **and** $\log_4 y=8$	
	•2 convert from log to exponential form	•2 $x=3$ **and** $y=4^8$	
	•3 interpret point and convert	•3 $x=0$ **and** $\log_4 y=-1$ $x=0$ **and** $y=4^{-1}$	
	•4 substitute into $y=ab^x$ and evaluate a	•4 $4^{-1}=ab^0 \Rightarrow a=\frac{1}{4}$	
	•5 substitute other point into $y=ab^x$ and evaluate b	•5 $4^8=\frac{1}{4}b^3 \Rightarrow b=64$	

Notes:

1. In any method, marks may only be awarded within a valid strategy using $y=ab^x$.
2. Accept $y=\frac{1}{4}\cdot 64^x$ for •5.
3. Markers must identify the method which best matches the candidates approach; they must not mix and match between methods.
4. Penalise the omission of base 4 at most once in any method.
5. Do not accept $a=4^{-1}$.

Commonly Observed Responses: