Solutions to Practice Question 1: Function Concepts

x	1	3	9	27	81
$f(x)$	0	4	8	12	16

1. Selected values of a function f are given in the table above. It is known that f is an increasing function defined for $x > 0$. The function g is given by $g(x) = \frac{x^2-5x+8}{3-x}$.

(A)	(i)	$h(3) = g(f(3)) = g(4) = -4.$	1 pt
	(ii)	Using the table, $f^{-1}(12) = 27.$	1 pt
(B)	(i)	Solving $g(x) = \frac{x^2-5x+8}{3-x} = -4$ gives $x = -1.562$ (or $x = -1.561$) and $x = 2.562$ (or $x = 2.561$).	1 pt
	(ii)	As x increases without bound, $g(x)$ decreases without bound. Thus, $\lim_{x\to\infty} g(x) = -\infty.$	1 pt
(C)	(i)	f is best modeled by a logarithmic function.	1 pt
	(ii)	As input values of f change multiplicatively by a factor of 3, output values of f change additively by a constant of 4.	1 pt