## 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

