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 $g(x) = \frac{x^2-5x+8}{3-x}$.
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(A) (i) The function h is defined by $h(x) = g\big(f(x)\big)$. Find the value of $h(3)$ as a decimal approximation or indicate that it is not defined.

(ii) Find the value of $f^{-1}(12)$ or state that it is not defined.

(B) (i) Find all values of x, as decimal approximations, for which $g(x) = 4$, or indicate that there are no such values.

(ii) Determine the end behavior of g as x increases without bound. Use limit notation in your answer.

(C) (i) Use the table of values for f to determine if f is best modeled by a linear, quadratic, cubic, exponential, or logarithmic function.

(ii) Give a reason for your answer based on the relationship between the change in the output values of f and the change in the input values of f.