

## 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) The function  $h$  is defined by  $h(x) = g(f(x))$ . 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  $f$ .