**Practice Question 1: Function Concepts**

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| $$x$$ | 1 | 3 | 9 | 27 | 81 |
| $$f\left(x\right)$$ | 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 $g\left(x\right)=\frac{x^{2}-5x+8}{3-x}$.
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| (A) | (i) | The function $h$ is defined by $h\left(x\right)=g\left(f\left(x\right)\right)$. Find the value of $h\left(3\right)$ as a decimal approximation or indicate that it is not defined.  |
| (ii) | Find the value of $f^{-1}\left(12\right)$ or state that it is not defined. |
| (B) | (i) | Find all values of $x$, as decimal approximations, for which $g\left(x\right)=4$, 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 $f$. |