I. State whether each statement is **True** or **False** as stated. Provide a clear reason for your answer.

- $f(g(x)) = f(x) \cdot g(x)$.

- The domain of the composite function $(f \circ g)(x)$ is the same as the domain of $f(x)$.

- If f and g are inverse functions, then the domain of f is the same as the domain of g.

- The graphs of $y = 3^x$ and $y = \left(\dfrac{1}{3}\right)^x$ are identical.

- .

II. Evaluate each expression using the values given in the table.

x	-3	-2	-1	0	1	2	3
f(x)	-7	-5	-3	-1	3	5	5
g(x)	8	3	0	-1	0	3	8

- $(f \circ g)(-1)$

- $(g \circ f)(-1)$

- $(g \circ g)(-2)$

- $(f \circ f)(-1)$

III. Given that $f(x) = 4x^3 - 3$ and $g(x) = 3 - \dfrac{1}{2}x^2$, find

- $(f \circ g)(4)$

- $(g \circ f)(2)$

- $(g \circ g)(0)$

- $(f \circ f)(1)$

IV. Find the domain of the composite function $f \circ g$ given that $f(x) = \dfrac{x}{x-1}$ and $g(x) = \dfrac{-4}{x}$.

V. Given that $f(x) = \sqrt{x-2}$ and $g(x) = 1 - 2x$, find

- $(f \circ g)(x)$

- $(g \circ f)(x)$

VI. Find functions f and g so that $f \circ g = H$ where $H(x) = \sqrt{x^2 + 1}$.

VII. Determine whether the function is one to one.

- $\{(1,2), (2,8), (3,18), (4,32)\}$

- $\{(2,6), (-3,6), (4,9), (1,10)\}$

VIII. The graph of a function f is given. Determine whether f is one to one.
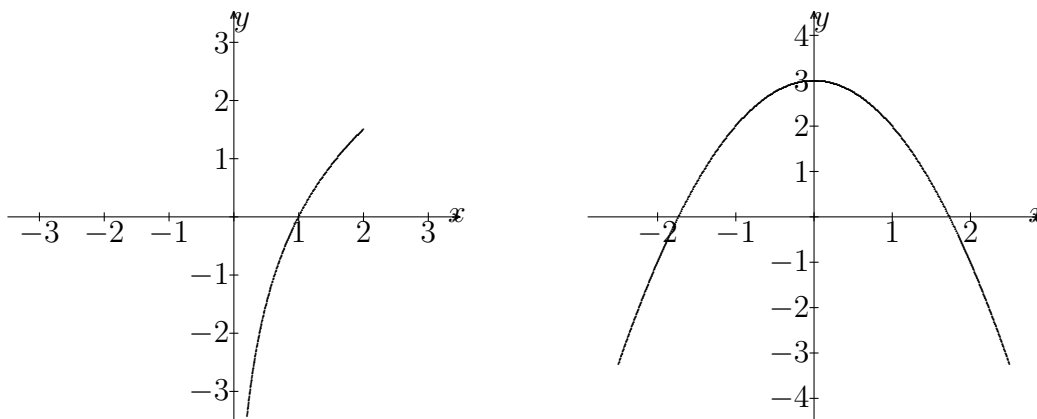

Figure 1:

IX. Find the inverse of the function $f(x) = \dfrac{2}{3+x}$. State the domain of f and find its range.

X. Solve the equations

- $\left(\dfrac{1}{2}\right)^{1-x} = 4$

- $4^x - 2^x = 0$