

Answer on Question #84748 – Math – Calculus

Question

Find the domain of the function f , defined by $f(x) = \sqrt{(x^3(9-x))}$

Solution

The domain is $D(f) = \{x \mid x^3(9-x) \geq 0\}$

$$x^3(9-x) = 0 \Leftrightarrow x = 0 \text{ or } x = 9$$

- 1) $x < 0$: $x^3 < 0$ and $9 - x > 0 \Rightarrow x^3(9-x) < 0$
- 2) $0 \leq x \leq 9$: $x^3 \geq 0$ and $9 - x \geq 0 \Rightarrow x^3(9-x) \geq 0$
- 3) $x > 9$: $x^3 > 0$ and $9 - x < 0 \Rightarrow x^3(9-x) < 0$

Answer: The domain is $D(f) = [0, 9] = \{x \mid x \in [0, 9]\}$.