

Answer on Question #75836 – Math – Calculus

Question

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

Solution

$$x^3(9 - x) \geq 0$$

Dividing by $x^2 \geq 0$

$$x(9 - x) \geq 0$$

Multiplying by (-1)

$$x(x - 9) \leq 0$$

The table of signs

	$x < 0$	$x = 0$	$0 < x < 9$	$x = 9$	$x > 9$
$x - 9$	-	-	-	0	+
x	-	0	+	+	+
$x(x - 9)$	+	0	-	0	+

It follows from the table of signs that the solution of the inequality $x(x - 9) \leq 0$ is $0 \leq x \leq 9$.

The domain of the function f is given by

$$D(f) = [0, 9].$$

Answer: $D(f) = [0, 9]$.