

Show that $f(x) = \cos(x \sin(x))$ is continuous everywhere.

Proof: Since $f(x) = \cos(x \sin(x))$ is continuous everywhere is true.

$e(x) = x$, $e(x)$ is continuous everywhere by polynomial function definition

$h(x) = \sin(x)$, $h(x)$ is continuous everywhere by trigonometric function definition

The product of $e(x) \cdot h(x)$ is continuous everywhere by composition definition

$$\begin{array}{ccc} & \text{"} & \text{"} \\ & x & \cdot \sin x \\ & \text{"} & \\ & x \sin x & \end{array}$$

$$g(x) = e(x) \cdot h(x)$$

$f(g(x))$ is continuous everywhere by composition definition.

$\therefore f(x) = \cos(x \sin(x))$ is continuous everywhere is true.