

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 at  $a$  by multiplication,  
where  $a$  is a real number on domain  $x$ .  
$$\begin{array}{ccc} & \text{"} & \text{"} \\ x & \cdot & \sin x \\ & \text{"} & \\ & x \sin x & \end{array}$$

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

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

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