

Exercise 31

Show that the function is continuous on its domain. State the domain.

$$h(x) = xe^{\sin x}$$

Solution

$\sin x$ is a trigonometric function and is continuous for $(-\infty, \infty)$. $\sin x$ yields a number between and including -1 and 1 ; the exponential function is continuous at all values in this interval, so $e^{\sin x}$ is continuous for $(-\infty, \infty)$ as well. The polynomial function x is continuous for $(-\infty, \infty)$, so the product of x and $e^{\sin x}$ given by $h(x)$ is continuous for $(-\infty, \infty)$ as well. Therefore,

$$h(x) = xe^{\sin x}$$

is continuous on its domain: $(-\infty, \infty)$. This is reflected in the graph of $h(x)$ versus x .

