

Exercise 32

Given the function $g(x) = 5 - x^2$, evaluate $\frac{g(x+h)-g(x)}{h}$, $h \neq 0$.

Solution

Evaluate the expression using the given function.

$$\begin{aligned}\frac{g(x+h)-g(x)}{h} &= \frac{[5-(x+h)^2]-(5-x^2)}{h} \\ &= \frac{[5-(x^2+2xh+h^2)]-(5-x^2)}{h} \\ &= \frac{(5-x^2-2xh-h^2)-(5-x^2)}{h} \\ &= \frac{5-x^2-2xh-h^2-5+x^2}{h} \\ &= \frac{-2xh-h^2}{h} \\ &= -2x-h\end{aligned}$$