Chapter 1

Functions and Graphs

Exercise Solution

Exercise 1.1.8

Instruction

Find the below values for the function $f(x) = 4x^2 - 3x + 1$, if they exist, then simplify.

(a) $f(0)$.

(b) $f(1)$.

(c) $f(3)$.

(d) $f(-x)$.

(e) $f(a)$.

(f) $f(a+h)$.

Solution

(a) $f(0) = 4 \cdot 0^2 - 3 \cdot 0 + 1 = 4 \cdot 0 - 0 + 1 = 0 - 0 + 1 = 1$.

(b) $f(1) = 4 \cdot 1^2 - 3 \cdot 1 + 1 = 4 \cdot 1 - 3 + 1 = 4 - 3 + 1 = 2$.

(c) $f(3) = 4 \cdot 3^2 - 3 \cdot 3 + 1 = 4 \cdot 9 - 9 + 1 = 36 - 9 + 1 = 28$.

(d) $f(-x) = 4(-x)^2 - 3(-x) + 1 = 4x^2 + 3x + 1$.

(e) $f(a) = 4a^2 - 3a + 1$.

(f) $$\begin{aligned} f(a+h) &= 4(a+h)^2 - 3(a+h) + 1 \\ &= 4(a^2 + 2ah + h^2) - 3a - 3h + 1 \\ &= 4a^2 + 4h^2 + 8ah - 3a - 3h + 1. \end{aligned}$$

Answer

(a) 1.

(b) 2.

(c) 28.

(d) $4x^2 + 3x + 1$.

(e) $4a^2 - 3a + 1$.

(f) $4a^2 + 4h^2 + 8ah - 3a - 3h + 1$.