Exercise 9

Find the average rate of change of the function $f(x) = 3 - 2x^2 + x$ by finding $\frac{f(b)-f(a)}{b-a}$.

Solution

Find the average rate of change from $x = a$ to $x = b$ of $f(x)$.

$$\begin{aligned}
\frac{f(b) - f(a)}{b - a} &= \frac{(3 - 2b^2 + b) - (3 - 2a^2 + a)}{b - a} \\
&= \frac{-2b^2 + b + 2a^2 - a}{b - a} \\
&= \frac{-2(b^2 - a^2) + (b - a)}{b - a} \\
&= \frac{-2(b + a)(b - a) + (b - a)}{b - a} \\
&= \frac{(b - a)[-2(b + a) + 1]}{b - a} \\
&= -2(b + a) + 1 \\
&= -2b - 2a + 1
\end{aligned}$$