Problem

Let's consider a consumer who is consuming chocolate bars. The consumer's utility (satisfaction) from consuming chocolate bars can be represented by the following utility function:

$$\mathrm{U}(x) = 10x - x^2$$

Where $\mathrm{U}(x)$ represents the total utility derived from consuming x chocolate bars. The consumer has already consumed four chocolate bars. Calculate the marginal utility from consuming the fifth chocolate bar using the marginal utility function we derived.

Solution

Now, let's find the marginal utility function, which represents the additional utility gained from consuming one more unit of the good. The marginal utility function is the derivative of the total utility function with respect to the quantity of chocolate bars consumed (x):

$$MU(x) = \frac{dU(x)}{dx}$$

$$MU(x) = \frac{d}{dx}(10x - x^2)$$

$$MU(x) = 10 - 2x$$

Now we have to calcualate the marginal utility for when $x = 4$:

$$MU(4) = 10 - 2 * 4$$

$$MU(4) = 10 - 8$$

$$MU(4) = 2$$

Answer: 2