



PROCESS



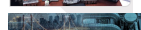
QUESTION	Consider the function $f(x) = 2x^3 - 3x^2 - 12x + 5$. Find the local extrema of $f(x)$.
ANSWER	The function is $f(x) = 2x^3 - 3x^2 - 12x + 5$. To find the local extrema, we first find the critical points by setting the first derivative equal to zero. $f'(x) = 6x^2 - 6x - 12 = 0$ Dividing by 6, we get: $x^2 - x - 2 = 0$ Factoring the quadratic equation: $(x - 2)(x + 1) = 0$ The critical points are $x = 2$ and $x = -1$. Next, we use the second derivative test to determine the nature of these critical points. $f''(x) = 12x - 6$ Evaluating the second derivative at the critical points: At $x = 2$: $f''(2) = 12(2) - 6 = 18 > 0$. Since $f''(2) > 0$, $x = 2$ is a local minimum. At $x = -1$: $f''(-1) = 12(-1) - 6 = -18 < 0$. Since $f''(-1) < 0$, $x = -1$ is a local maximum. Finally, we find the function values at these critical points: At $x = 2$: $f(2) = 2(2)^3 - 3(2)^2 - 12(2) + 5 = 16 - 12 - 24 + 5 = -15$. At $x = -1$: $f(-1) = 2(-1)^3 - 3(-1)^2 - 12(-1) + 5 = -2 - 3 + 12 + 5 = 12$. Therefore, the function has a local minimum at $(2, -15)$ and a local maximum at $(-1, 12)$.



EQUIPMENT



COMMUNICATION



BACKING

