Math-71 Sections 02, 03, 60

Homework #10 Solutions

Problem

Evaluate the following definite integral:

$$\int_1^2 \left(x^3 - 2x^2 + 3x - 4\right) dx$$

$$\begin{aligned}
\int_1^2 \left(x^3 - 2x^2 + 3x - 4\right) dx &= \left[\frac{1}{4}x^4 - \frac{2}{3}x^3 + \frac{3}{2}x^2 - 4x\right]_1^2 \\
&= \left[\frac{1}{4}(2)^4 - \frac{2}{3}(2)^3 + \frac{3}{2}(2)^2 - 4(2)\right] - \left[\frac{1}{4}(1)^4 - \frac{2}{3}(1)^3 + \frac{3}{2}(1)^2 - 4(1)\right] \\
&= \left(4 - \frac{16}{3} + 6 - 8\right) - \left(\frac{1}{4} - \frac{2}{3} + \frac{3}{2} - 4\right) \\
&= 6 - \frac{14}{3} - \frac{1}{4} - \frac{3}{2} \\
&= \frac{72}{12} - \frac{56}{12} - \frac{3}{12} - \frac{18}{12} \\
&= -\frac{5}{12}
\end{aligned}$$