

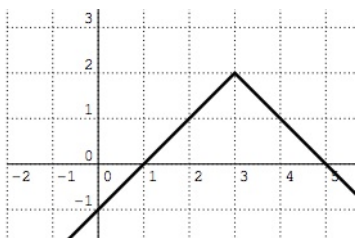
Evaluate each definite integral. Show all your work: simplify your result, reduce fractions to lowest terms if necessary. No decimals. You must show at least some work in each problem in order to receive credit.

$$\begin{aligned} 1) \int_0^3 (x^2 - 3 + 5e^x) dx &= \left[\frac{x^3}{3} - 3x + 5e^x \right]_0^3 \\ &= \left(\frac{3^3}{3} - 3(3) + 5e^3 \right) - \left(\frac{0^3}{3} - 3(0) + 5e^0 \right) \\ &= (9 - 9 + 5e^3) - (0 - (0) + 5) \\ &= 5e^3 - 5 \end{aligned}$$

$$\begin{aligned} 2) \int_0^2 \left(\frac{4x^2 - 2}{x^2} \right) dx &= \int_0^2 (4 - 2x^{-2}) dx \\ &= \left[4x - \frac{2x^{-1}}{-1} \right]_0^2 \\ &= \left[4x + \frac{2}{x} \right]_0^2 \end{aligned}$$

There is a typo in the problem: this cannot be evaluated at $x=0$, obviously. So we have to stop here and say that this definite integral is undefined.

3) The graph of $f(x)$ is given. Use it to evaluate the definite integral $\int_0^3 f(x) dx$



$$\int_0^3 f(x) dx = (-\text{area under x-axis between } x=0 \text{ and } x=1) + (\text{area above x-axis between } x=1 \text{ and } x=3)$$

These are both right triangles,

$$\int_0^3 f(x) dx = -\frac{1}{2}(1)(1) + \frac{1}{2}(2)(2) = -\frac{1}{2} + 2 = \frac{3}{2}$$
