Calculus I Definite integral of linear function, part 2

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2019

$$\int_0^3 (x^3 - 6x) \mathrm{d}x$$

$$\int_0^3 (x^3 - 6x) dx = \left[\int (x^3 - 6x) dx \right]_0^3$$

$$\int_0^3 (x^3 - 6x) dx = \left[\int (x^3 - 6x) dx \right]_0^3$$
$$= \left[\int x^3 dx - 6 \int x dx \right]_0^3$$

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$$= \begin{bmatrix} ? & -6? \end{bmatrix}_0^3$$

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$$= \left[\frac{x^4}{4} - 6? \right]_0^3$$

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$$= \left[\frac{x^{4}}{4} - 6 \frac{x^{2}}{2} \right]_{0}^{3}$$

$$= \left(\frac{1}{4} \cdot 3^{4} - 3 \cdot 3^{2} \right) - \left(\frac{1}{4} \cdot 0^{4} - 3 \cdot 0^{2} \right)$$

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$$= \left(\frac{1}{4} \cdot 3^4 - 3 \cdot 3^2 \right) - \left(\frac{1}{4} \cdot 0^4 - 3 \cdot 0^2 \right)$$

$$= \frac{81}{4} - 27 - 0 + 0 = -\frac{27}{4}.$$