December 5

Compare the two solution methods below

$$\int_{-1}^{1} 5x - x^2\,dx = \left(\frac{5x^2}{2} - \frac{x^3}{3}\Big|_{-1}^{1}\right)$$
$$= \frac{5(1)^2}{2} - \frac{(1)^3}{3} - \left(\frac{5(-1)^2}{2} - \frac{(-1)^3}{3}\right)$$
$$= \frac{5}{2} - \frac{1}{3} - \left(\frac{5}{2} + \frac{1}{3}\right)$$
$$= \frac{5}{2} - \frac{1}{3} - \frac{5}{2} - \frac{1}{3}$$
$$= -\frac{2}{3}$$

$$\int_{-1}^{1} 5x - x^2\,dx = 5\int_{-1}^{1} x\,dx - \int_{-1}^{1} x^2\,dx$$
$$= 5\left(\frac{x^2}{2}\Big|_{-1}^{1}\right) - \left(\frac{x^3}{3}\Big|_{-1}^{1}\right)$$
$$= 5\left(\frac{(1)^2}{2} - \frac{(-1)^2}{2}\right) - \left(\frac{(1)^3}{3} - \frac{(-1)^3}{3}\right)$$
$$= 5\left(\frac{1}{2} - \frac{1}{2}\right) - \left(\frac{1}{3} + \frac{1}{3}\right)$$
$$= 5(0) - \left(\frac{2}{3}\right)$$
$$= -\frac{2}{3}$$

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Students will verbally explain how to find the exact area under a curve using definite integrals

(using the words:
right, left, above, below, antiderivative…)