

1. (3pts) Evaluate $\int_{-1}^2 (8x^3 - 10) dx$.

$$\begin{aligned} \int_{-1}^2 (8x^3 - 10) dx &= 2x^4 - 10x \Big|_{-1}^2 = (2(2)^4 - 10(2)) - (2(-1)^4 - 10(-1)) \\ &= 2^5 - 20 - 12 \\ &= 32 - 32 \\ &= 0 \end{aligned}$$

2. (3pts) Find $\frac{d}{dx} \int_3^x \frac{\cos(t)}{t^2 - 5t + 2} dt$. = $\frac{\cos(x)}{x^2 - 5x + 2}$

3. (4pts) Find the average of the function $f(x) = 2x^2 - 6$ on the interval $[2, 5]$.

$$\begin{aligned} \frac{1}{5-2} \int_2^5 (2x^2 - 6) dx &= \frac{1}{3} \left[\frac{2}{3} x^3 - 6x \right]_2^5 \\ &= \frac{1}{3} \left[\left(\frac{2}{3} (5)^3 - \frac{2}{3} (2)^3 \right) - (6(5) - 6(2)) \right] \\ &= \frac{1}{3} \left[\frac{250}{3} - \frac{16}{3} - (30 - 12) \right] = \frac{1}{3} \left[\frac{234}{3} - 18 \right] \\ &= \frac{1}{3} [78 - 18] = \frac{1}{3} (60) = 20 \end{aligned}$$