HOMEWORK 8

Calculate the following integrals. Draw the region whose area is defined by each integral:

1.) \[ \int_{4}^{8} e^{2x} \, dx \]

2.) \[ \int_{3}^{7} 12 - 3x \, dx \]

Calculate the following integrals:

3.) \[ \int_{1}^{e} (4t^4 + 1 + 2t^{-1}) \, dt \]

4.) \[ \int_{1}^{8} 2x^{3/4} \, dx \]

5.) \[ \int_{2734.28}^{-2734.28} (22x^{27} - 13x^{509} + x + 13.08x^{363}) \, dx \] (simplify as much as possible).

6.) \[ \int_{-10}^{e^{\pi}} \left( e^x + \frac{1}{2}x^2 + 1 \right) \, dx \]

7.) Find the area under \( y = x^2 - 2x - 3 \) from \( x = 1 \) to \( x = 5 \). Sketch the area you are finding.

8.) Diet Pepsi is consumed in Briggs Hall at a rate of \( 50 + 2t \) oz. a day, where \( t \) is the number of days into the term. If winter term lasts 70 days, how much Diet Pepsi is consumed during winter term?

9.) Pat’s new business sells flashlight pens. The marginal costs are given by \( 5 + 2x + \frac{3}{x} \), and the marginal revenues are given \( 10 - \frac{1}{\sqrt{x}} \). How much profit does Pat make on the first 64 pens sold?

10.) What quantity of pens should Pat make to maximize profit?