



3. An aquarium has a 2 ft by 1 ft rectangular base, and it is 1 ft tall. If it is full of water, how much work is required to pump all of the water out of the aquarium (water weighs 62.5 lb/ft<sup>3</sup>)?

4. Find  $\int x^2 e^x dx$  without using a calculator.

5. Does the series  $\sum_{n=0}^{\infty} \frac{1}{8^n}$  converge? Justify your answer.

6. Does the series  $\sum_{n=1}^{\infty} \frac{4n+5}{7n+2}$  converge? Justify your answer.

7. Find the arc length of the curve  $y = \cos x$ ,  $0 \leq x \leq \frac{\pi}{2}$ .

8. Find the area of the surface obtained by rotating the curve  $y = \sqrt{100 - x^2}$ ,  $-10 \leq x \leq 10$ , about the  $x$ -axis.

9. Consider the parametric curve  $x = 5t^3 + 7t + 1$ ,  $y = 7t^2 + 9t + 6$ ,  $0 \leq t \leq 5$ . Find the slope of the tangent line to this curve at  $t = 4$ .

10. Find  $\int \frac{5x - 1}{x^2 + x - 12} dx$  without using a calculator.

11. Evaluate  $\int_0^1 x^3 \sqrt{1-x^2} dx$  without using a calculator.

12. Find the radius and interval of convergence for the power series  $\sum_{n=1}^{\infty} \frac{(x-5)^n}{n}$ .