

1 PART I: Differentiation

Differentiate the following functions

1. $y = (2x - 7)^4$

2. $y = e^{\pi/4}$

3. $y = 7x^4 - 3\sqrt[5]{x} + \frac{2}{5x^2}$

4. $y = \ln(2x + \cos x)$

5. $y = 2xe^{-x}$

6. $y = \frac{\tan 3x}{\sqrt{4-x}}$

7. $y = \csc(e^{4x})$

8. $y = [\ln(4x^3 - 2x)]^3$

9. $y = e^{4\sqrt{x}}$

10. $y = 4e^{x \sin x}$

11. $y = \frac{2}{(3x^2 - 1)^2}$

2 PART II: Integration

1. $\int (3x^4 - \sqrt[3]{x^2} + \frac{2}{\sqrt{x}}) dx$

2. $\int xe^{x^2} dx$

3. $\int e^{x^2} dx$

4. $\int e^{-x/3} dx$

5. $\int_0^{\pi/6} 4 \sin(2x) dx$

6. $\int \sec(4x) \tan(4x) + 3 \sec^2 \frac{x}{5} dx$

7. $\int_1^4 (\sqrt{x} - 1)^2 dx$

8. $\int_0^1 \sqrt{e^{3x}} dx$

9. $\int \frac{2}{(3x)^2} dx$

3 PART III: Concepts

1. Find a lower sum for $f(x) = \sin x$ over the interval $[0, \pi]$ for $n = 6$ following the steps below:

1. Draw the graph of $f(x)$ in the given interval

2. Find $\Delta(x)$ (this will give you the width of each rectangle)

3. Draw rectangles, find their areas and sum them up to a Riemann sum.