

Math 2 – Practice Midterm 1

1. Evaluate

$$\frac{d}{dx} \left[\sin \left[\left(\sqrt{4x+5} \right) \left(\sqrt[3]{x+3} \right) \right] \right].$$

2. Evaluate

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

3. Evaluate

$$\int \frac{1 + \sqrt{x}}{\sqrt[3]{x}} dx.$$

4. Evaluate

$$\int (3x^2 + 5)(x^3 + 5x - 3)^9 dx.$$

5. Evaluate

$$\int (2w^{-3} - 3w^2) dw.$$

6. Find $f(x)$ given

$$f''(x) = x^2 + 3 \cos(x), \quad f(0) = 2, \quad f'(0) = 3.$$

7. Determine the area of the circumscribed rectangular polygon defined by the function $f(x) = x^4 + 4$, between $x = 1$ and $x = 4$ using $\Delta x = 1$. Sketch a graph of the function and show what area you are calculating.

8. Find the area enclosed by the curves $f(x) = x^3 + x^2 + 1$, $y = 0$, $x = 1$ and $x = 3$.

9. Evaluate

$$\int_2^{-3} (x^2 - 10x + 7) dx.$$

10. Evaluate

$$\int_{-1}^1 13x^2(x^3 + 1)^3 dx.$$

11. Evaluate

$$\int_1^2 (4s^{-5} - 5s^4) ds.$$

12. Evaluate

$$\int_0^{\pi/2} \sin^3(x) \cos(x) dx.$$

13. Suppose that a television is dropped out of a window on the 32nd floor of a New York city apartment building. (That is, it is dropped from a height of 320ft.) (Use $-32 \text{ft}/\text{sec}^2$ as the gravitational constant.)

(a) How long does it take before the TV smashes on the sidewalk below?

(b) What is the velocity of the TV immediately before it crashes onto the sidewalk?