Extra Practice – Chapter 4

Solve the differential equations:

1. $f''(x) = 5\cos x + 2\sin x \quad f(0) = 3 \quad f'(0) = 4$
2. $f'(x) = 6x^2 + x - 5 \quad f(0) = 2$
3. A stone is thrown upward from a position 144 ft above the ground with a velocity of 96 ft/sec. Find
   a) the stone's distance above ground at time t
   b) when and with what velocity the stone strikes the ground

Evaluate the following:

4. $\int_{-2}^{3} |x| + 2 \, dx$
5. $\int_{-3}^{0} \sqrt{9 - x^2} \, dx$
6. $\int \frac{1}{\cos x \cot x} \, dx$
7. $\int \frac{(x^2 - 1)^2}{x^2} \, dx$
8. $\int_{-1}^{1} \frac{x^3 + 3x^2 - 9x - 2}{x - 2} \, dx$
9. $\frac{d}{dx} \int_{\sqrt{x}}^{3} t^2 \sin t \, dt$
10. $\frac{d}{dx} \int_{x^3}^{\sec x} t\sqrt{1 - t^2} \, dt$
11. Find the average value of $f(x) = 3x^2 - 2x + 3$ on $[-1, 3]$ and find the value of c to satisfy MVT for integrals.
12. Find the average value of $y = 2 + 3\sqrt{x}$ on $[1, 4]$ and find the value of c to satisfy MVT for integrals.
13. Given $f(x) = \frac{1}{x}$, approximate $\int_{1}^{4} f(x) \, dx$ using 6 subintervals
    a) LRAM b) RRAM c) MRAM d) Trapezoidal Rule