Homework 14

§5.4#7, 9, 15, 21, 54–56, **22**, **30**

§6.2#9, 15, 37–49(odd), 51*, 53*, 55*, **64**, **66**, **76**

§5.4 #7. Find the average value of the function $g(t) = 1 + t$ over the interval $[0, 2]$.

§5.4 #9. Find the average value of the function $f(x) = 2$ over the interval $[a, b]$.

§5.4 #15. Find the area between $y = x^2$ and $y = x^3$ over the interval $0 \leq x \leq 1$.

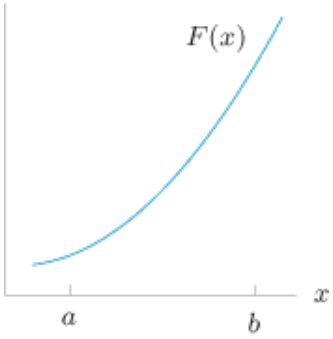
§5.4 #21. Let $\int_0^3 f(x)dx = 6$.

a) What is the average value of $f(x)$ over the interval $x = 0$ to $x = 3$?

b) If $f(x)$ is even, what is $\int_{-3}^3 f(x)dx$? What is the average value of $f(x)$ on the interval $[-3, 3]$?

c) If $f(x)$ is odd, what is $\int_{-3}^3 f(x)dx$? What is the average value of $f(x)$ on the interval $[-3, 3]$?

§5.4 #54-56 Assume $F' = f$. Mark the following quantities on the graph below:

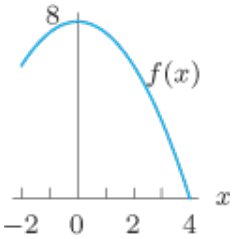


54) A slope representing $f(a)$

55) A length representing $\int_a^b f(x)dx$

56) A slope representing $\frac{1}{b-a}\int_a^b f(x)dx$

§5.4 #**22**. Using the graph of $f(x)$, write $\int_0^3 f(x)dx$ in terms of $\int_{-1}^1 f(x)dx$ and $\int_1^3 f(x)dx$.



§5.4 #**30**. If the average value of f on the interval $2 \le x \le 5$ is 4, find $\int_2^5 (3f(x) + 2)dx$.

§6.2 #9. Find an antiderivative of $g(z) = \frac{1}{z^3}$

§6.2 #15. Find an antiderivative of $f(t) = \frac{t^2+1}{t}$

§6.2 #37. $\int 5x + 7 \; dx =$

§6.2 #39. $\int 2 + \cos(t) \; dt =$

§6.2 #41. $\int 3e^x + 2\sin(x) \; dx =$

§6.2 #43. $\int 5x^2 + 2\sqrt{x} \; dx =$

§6.2 #45. $\int \frac{8}{\sqrt{x}} \; dx =$

§6.2 #47. $\int e^x + 5 \; dx =$

§6.2 #49. $\int \sqrt{x^3} - \frac{2}{x} \; dx =$

§6.2 #51*. Evaluate exactly: $\int_0^3 x^2 + 4x + 3 \; dx$

§6.2 #53*. Evaluate exactly: $\int_0^{\pi/4} \sin(x) dx$

§6.2 #55*. Evaluate exactly: $\int_0^2 3e^x dx$

§6.2 **#64**. In drilling an oil well, the total cost, C, consists of fixed costs (independent of the depth of the well) and marginal costs, which depend on depth; drilling becomes more expensive, per meter, deeper into the earth. Suppose the fixed costs are 1,000,000 riyals (the riyal is the unit of currency of Saudi Arabia), and the marginal costs are $C'(x) = 4000 + 10x$ riyals per meter where x is the depth in meters. Find the total cost of drilling a well x meters deep.

§6.2 #**66**. Find the exact area of the region bounded by the x-axis and the graph of $y = x^3 - x$.

§6.2 #**76**. Sketch the parabola $y = x(x - \pi) = x^2 - \pi x$ and the curve $y = \sin(x)$, showing their points of intersection. Find the exact area between the two graphs.