Calculus 112 Practice Problems

Section 5.4 Problems #28-31, #44-47

28. We have

$$8 = \int_{-2}^{5} f(x)\,dx = \int_{-2}^{2} f(x)\,dx + \int_{2}^{5} f(x)\,dx.$$

Since f is odd, $\int_{-2}^{2} f(x)\,dx = 0$, so $\int_{-2}^{5} f(x)\,dx = 8$.

29. Since f is even, $\int_{0}^{2} f(x)\,dx = (1/2)6 = 3$ and $\int_{0}^{5} f(x)\,dx = (1/2)14 = 7$. Therefore

$$\int_{2}^{5} f(x)\,dx = \int_{0}^{5} f(x)\,dx - \int_{0}^{2} f(x)\,dx = 7 - 3 = 4.$$

30. We have

$$18 = \int_{2}^{5} (3f(x) + 4)\,dx = 3\int_{2}^{5} f(x)\,dx + \int_{2}^{5} 4\,dx.$$

Thus, since $\int_{2}^{5} 4\,dx = 4(5-2) = 12$, we have

$$3\int_{2}^{5} f(x)\,dx = 18 - 12 = 6,$$

so

$$\int_{2}^{5} f(x)\,dx = 2.$$

31. We have $\int_{2}^{4} f(x)\,dx = 8/2 = 4$ and $\int_{4}^{5} f(x)\,dx = -\int_{5}^{4} f(x)\,dx = -1$. Thus

$$\int_{2}^{5} f(x)\,dx = \int_{2}^{4} f(x)\,dx + \int_{4}^{5} f(x)\,dx = 4 - 1 = 3.$$

44. See Figure 5.47.

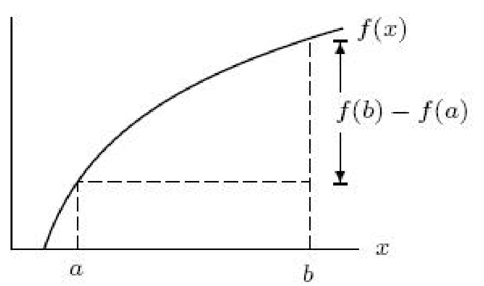

Figure 5.47

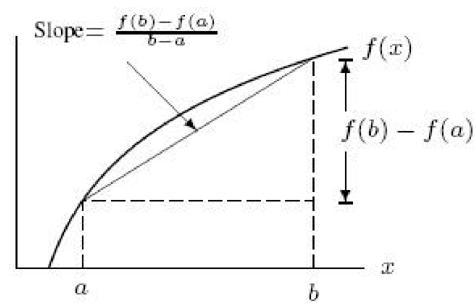

Figure 5.48

45. See Figure 5.48.

46. See Figure 5.49.

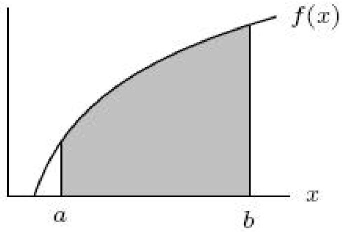

Figure 5.49

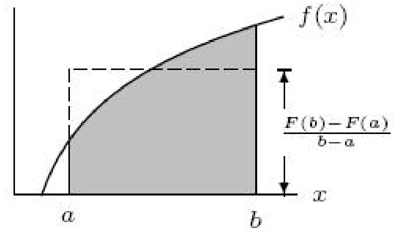

Figure 5.50

47. See Figure 5.50. Note that we are using the interpretation of the definite integral as the length of the interval times the average value of the function on that interval, which we developed in Section 5.3.