

Assignment 1

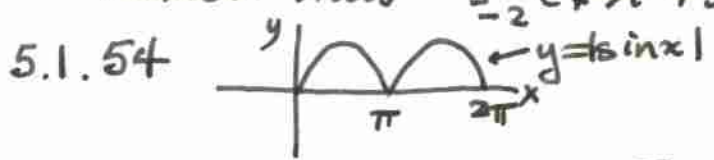
- § 5.1: 46, 48, 52, 54, 64, 66, 70
- § 5.2: 52, 54, 58
- § 5.3: 38, 44, 50, 52, 56, 58
- § 5.4: 24, 26, 28, 32, 34, 52, 70, 74
- § 5.6: 16
- § 5.7: 16, 30, 38

Solutions/Hints:

5.1.46 $\int_0^4 (3-2f(x)) dx = \int_0^4 3 dx - 2 \int_0^4 f(x) dx = 3x \Big|_0^4 - 2 \left(\int_0^2 f dx + \int_2^4 f dx \right)$
 $= 12 - 0 - 2(2+1) = 12 - 18 = -6$

5.1.48 If $f(x) < 3$ in $[2, 4]$, then $\int_2^4 f(x) dx \leq 3(4-2) = \text{area of rectangle above } f \text{ on } [4, 2], \text{ i.e.}$
 $\int_2^4 f(x) dx \leq 6$. This contradicts the given $\int_2^4 f(x) dx = 7$.

5.1.52 $f(x) = 7x^5 + 6$ is an odd fn and so the graph for negative x is the negative of the graph for positive x . This means that the integrals from -2 to 0 and 0 to 2 cancel. Thus $\int_{-2}^2 (7x^5 + 3) dx = 0$.



So $\int_0^{2\pi} |\sin x| dx = 2 \int_0^{\pi} \sin x dx = 4$

5.1.64 Using a graphing calculator we find that $2.29 \leq e^x \sin x \leq 7.45$ for $1 \leq x \leq 3$
 Thus $2.29 \times 2 \leq \int_1^3 e^x \sin x dx \leq 7.45 \times 2$
 and so, in particular, $4.5 \leq \int_1^3 e^x \sin x dx \leq 15$

5.1.66 $\frac{1}{1} \int_0^1 f(x) dx = 2, \frac{1}{2} \int_0^3 f(x) dx = 4$. These are given.
 Thus $\frac{1}{3} \int_0^3 f(x) dx = \frac{1}{3} \left[\int_0^1 + \int_1^3 \right] = \frac{1}{3} [2 + 8] = \frac{10}{3}$