

Homework Set 4

(sect 5.2 & 5.3: Evaluating Definite Integrals)

1. If $\int_1^4 \sqrt{x} dx = \frac{14}{3}$, what is $\int_4^1 \sqrt{x} dx$?

2. Evaluate: $\int_0^1 x^2 \cos x dx$

3. Write as a single integral in the form $\int_a^b f(x) dx$:

$$\int_{-2}^3 f(x) dx + \int_3^7 f(x) dx - \int_{-2}^{-1} f(x) dx =$$

4. If $\int_{-1}^4 f(x) dx = 13$ and $\int_{-1}^2 f(x) dx = 7.4$, find $\int_2^4 f(x) dx$.

5. If $\int_2^5 f(x) dx = 4$ and $\int_2^5 g(x) dx = 5$, find $\int_2^5 [3f(x) - 2g(x)] dx$.

Evaluate the definite integral by interpreting it in terms of area. Draw the graph of the function.

6. $\int_0^4 \sqrt{16 - x^2} dx$

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

8. $\int_1^{10} |x - 5| dx$

Evaluate the definite integrals using antiderivatives.

$$9. \int_0^3 (1 + 2u - 4u^3) du$$

$$10. \int_0^1 x(\sqrt[3]{x} - \sqrt[4]{x}) dx$$

$$11. \int_1^2 \frac{y+5y^7}{y^3} dy$$

$$12. \int_0^4 (2t + 5)(3t - 1) dt$$

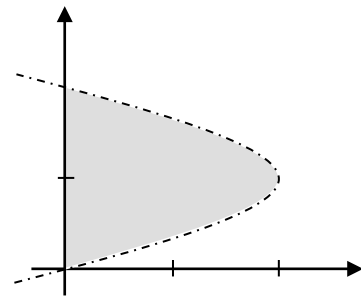
$$13. \int_0^5 (2e^x + 4 \cos x) dx$$

$$14. \int_1^9 \frac{dx}{2x}$$

15. $\int_0^{\pi/4} (1 + \sec^2 x) dx$

16. $\int_{-1}^1 e^{x+1} dx$

17. The area of the region that lies to the right of the y-axis and to the left of the parabola $x = 4y - 2y^2$ (the shaded region in the figure) is given by the integral $\int_0^2 (4y - 2y^2) dy$. (Turn your head clockwise and think of the region as lying below the curve $x = 4y - 2y^2$ from $y = 0$ to $y = 2$.) Find the area of this region.



18. The acceleration function $a(t) = 2t + 3$ in m/sec² and the initial velocity $v(0) = -4$ for a particle moving along a line are given. Find the velocity at time t and the distance traveled over the first 3 seconds.