

$$\begin{aligned} 1. \quad \int_{-1}^3 x^5 dx \\ &= \frac{1}{6} x^6 \Big|_{-1}^3 \\ &= \frac{1}{6} [3^6 - (-1)^6] = \frac{364}{3} = 121\frac{1}{3} \end{aligned}$$

$$\begin{aligned} 2. \quad \int_1^3 (1+2x-4x^2) dx \\ &= x + x^2 - x^3 \Big|_1^3 \\ &= (3+9-81) - (1+1-1) = -70 \end{aligned}$$

$$\begin{aligned} 4. \quad \int_{-2}^0 (u^5 - u^3 + u^2) du \\ &= \frac{1}{6} u^6 - \frac{1}{4} u^4 + \frac{1}{3} u^3 \Big|_{-2}^0 \\ &= \left[\frac{1}{6} (2)^6 - \frac{1}{4} (2)^4 - \frac{1}{3} (2)^3 \right] = -4 \end{aligned}$$

$$\begin{aligned} 10. \quad \int_0^4 (2v+5)(3v-1) dv \\ &= \int_0^4 (6v^2 + 13v - 5) dv \\ &= 2v^3 + \frac{13}{2} v^2 - 5v \Big|_0^4 \\ &= 2(4)^3 + \frac{13}{2} (4)^2 - 20 = 212 \end{aligned}$$

$$\begin{aligned} 12. \quad \int_1^2 \frac{y+5y^7}{y^3} dy \\ &= \int_1^2 (y^{-2} + 5y^4) dy \\ &= -y^{-1} + y^5 \Big|_1^2 \\ &= \left(-\frac{1}{2} + 32\right) - (-1+1) = 31\frac{1}{2} \end{aligned}$$

$$\begin{aligned} 13. \quad \int_0^1 x(\sqrt[3]{x} + \sqrt[5]{x}) dx \\ &= \int_0^1 (x^{4/3} + x^{5/4}) dx \\ &= \frac{3}{7} x^{7/3} + \frac{4}{9} x^{9/4} \Big|_0^1 \\ &= \frac{3}{7} + \frac{4}{9} = \frac{55}{63} \end{aligned}$$

$$\begin{aligned} 14. \quad \int_1^9 \frac{3x-2}{\sqrt{x}} dx \\ &= \int_1^9 (3\sqrt{x} - 2x^{-1/2}) dx \\ &= 2x^{3/2} - 4x^{1/2} \Big|_1^9 \\ &= [2(3)^3 - 4 \cdot 3] - (2-4) = 44 \end{aligned}$$

$$\begin{aligned} 15. \quad \int_0^{\pi/4} \sec^2 t dt \\ &= \tan t \Big|_0^{\pi/4} \\ &= \tan(\pi/4) - \tan(0) \\ &= 1 - 0 = 1 \end{aligned}$$

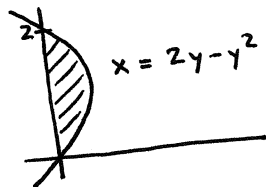
$$\begin{aligned} 16. \quad \int_0^5 (2e^x + 4\cos x) dx \\ &= 2e^x + 4\sin x \Big|_0^5 \\ &= (2e^5 + 4\sin 5) - (2e^0 + 4\sin 0) \\ &= 2e^5 + 4\sin 5 - 2 \end{aligned}$$

$$\begin{aligned} 17. \quad \int_1^9 \frac{1}{2x} dx \\ &= \frac{1}{2} \int_1^9 \frac{1}{x} dx = \frac{1}{2} \ln x \Big|_1^9 \\ &= \frac{1}{2} \ln 9 - \frac{1}{2} \ln 1 \\ &= \ln 3 \end{aligned}$$

$$\begin{aligned} 20. \quad \int_0^1 \frac{4}{t^2+1} dt \\ &= 4 \arctan t \Big|_0^1 \\ &= 4 \arctan 1 \\ &= \pi \end{aligned}$$

$$\begin{aligned} 38. \quad \int x \cos x dx &= x \sin x + \cos x + C \\ \frac{d}{dx}(x \sin x + \cos x + C) &= \sin x + x \cos x - \sin x + 0 \quad \checkmark \\ &= x \cos x \end{aligned}$$

45.

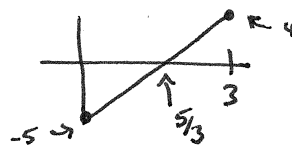


$$\begin{aligned} \int_0^2 (2y - y^2) dy &= y^2 - \frac{1}{3}y^3 \Big|_0^2 \\ &= 4 - \frac{1}{3} \cdot 8 \\ &= 1\frac{1}{3} \end{aligned}$$

$$55. \quad v(t) = 3t - 5, \quad 0 \leq t \leq 3$$

$$\begin{aligned} \text{a) displacement} &= \int_0^3 v(t) dt \\ &= \int_0^3 (3t - 5) dt = \left[\frac{3}{2}t^2 - 5t \right]_0^3 \\ &= \frac{3}{2} \cdot 9 - 5 \cdot 3 \\ &= \frac{27}{2} - 15 = -1.5 \end{aligned}$$

$$\text{b) distance} = \int_0^3 |v(t)| dt$$



$$\begin{aligned} \int_0^3 |3t - 5| dt &= -\int_0^{5/3} (3t - 5) dt + \int_{5/3}^3 (3t - 5) dt \\ &= \left[-\frac{3}{2}t^2 + 5t \right]_0^{5/3} + \left[\frac{3}{2}t^2 - 5t \right]_{5/3}^3 \\ &= 6.8\bar{3} \end{aligned}$$

65. Marginal Cost:

$$C'(x) = 3 - .01x + .000006x^2$$

Find incr. in cost if production is raised from 2000 yd to 4000 yd.

incr in Cost:

$$\int_{2000}^{4000} C'(x) dx$$

$$= \int_{2000}^{4000} (3 - .01x + .000006x^2) dx$$

$$= 3x - .005x^2 + .000002x^3 \Big|_{2000}^{4000}$$

$$\begin{aligned} &= [3(4000) - .005(4000)^2 + .000002(4000)^3] \\ &\quad - [3(2000) - .005(2000)^2 + .000002(2000)^3] \end{aligned}$$

$$= 60000 - 2000 = 58000$$