

1. (a) $A = \frac{7}{2} - 2 \ln 2$
(b) $V = \int_1^2 2\pi x(3x - \frac{2}{x} - 1) dx = 7\pi$
(c) $V = \int_1^2 \pi \left[(3x)^2 - \left(\frac{2}{x} + 1\right)^2 \right] dx$
2. $y' = \arctan\left(\frac{1}{x}\right) + x \cdot \frac{-\frac{1}{x^2}}{1 + \frac{1}{x^2}}$
3. (a) $\frac{1}{4}e^2 + \frac{1}{4}$ (b) $2 \tan \theta + \sec \theta - \ln |\sec \theta| + C$
(c) $\frac{1}{3}(16 + x^2)^{3/2} - 16(16 + x^2)^{1/2} + C$ (d) $\frac{4}{45}$
(e) $\ln |2x + 1| + \frac{1}{x-2} + C$ (f) $\frac{4}{5}(x + 3)^{5/2} - 4(x + 3)^{3/2} + C$
4. (a) $\frac{1}{2}$ (b) $-\infty$ (c) 4
5. (a) Converges: = 1 (b) Converges: = $\frac{1}{36}$
6. $y = -\sqrt{2x + 2 \ln x + 2}$
7. Converges (to 0).
8. $\frac{3}{2}$
9. (a) Converges (RT) (b) Diverges (n TT)
(c) Converges ($\sqrt[n]{T}$) (d) Converges (LCT with $\sum \frac{1}{n^{3/2}}$)
10. (a) CC: (f T and AST) (b) AC (GS)
11. $-6 \leq x < 2$
12. M.S.: $1 - x + x^2 - x^3 + x^4 \mp \dots = \sum_{n=0}^{\infty} (-1)^n x^n$
Radius of convergence: 1