1. Evaluate the following integrals:

(a) \[ \int \frac{dx}{x + 3} \]

(b) \[ \int \frac{dx}{(x - 4)^3} \]

(c) \[ \int \frac{x}{x^2 + 17} \, dx \]

(d) \[ \int \frac{dx}{x^2 + 19} \]

(e) \[ \int \frac{dx}{\sqrt{16 - x^2}} \]

2. The region bounded by \( y = \cos(x) \), \( y = \sin(x) \) and \( x = 0 \) is rotated about the \( x \)-axis. Use an integral to find the volume.
3. The region bounded by $y = 0$, $y = e^x$, $x = 0$ and $x = 1$ is rotated about the line $x = -1$. Use an integral to find the volume.

4. Evaluate the following trigonometric integrals:
   
   (a) $\int \tan^2(x) \sec^4(x) \, dx$

   (b) $\int \sin^5(x) \, dx$
5. Convert the following to simplified trigonometric integrals in terms of sin and cos only. DO NOT evaluate the integrals:

(a) \[ \int \frac{dx}{(x^2 - 16)^{3/2}} \]

(b) \[ \int \frac{dx}{(\sqrt{x^2 + 25})^5} \]
6. Find the partial fraction decomposition of the following. DO NOT evaluate the associated integrals:

(a) \[ \frac{3x - 1}{(x - 1)(x + 2)} \]

(b) \[ \frac{x^2 - 2x + 3}{(x + 1)(x^2 + 4)} \]