1. Come up with an integral which expresses the volume of a solid whose base is a disc of radius 1 and whose sections perpendicular to the base are equilateral triangles (DO NOT evaluate the integral).

2. Find the following indefinite integrals:

   (a) \[ \int \sin(p) \cos^3(p) + 4e^{3p} \, dp \]
   (b) \[ \int \frac{6}{s^2 + 2s + 2} \, ds \]
   (c) \[ \int \frac{t - 1}{t + 1} \, dt \]

3. Find the area between \( x^2 + 2, 12 - 3x \) and the first quadrant \( (x \geq 0, y \geq 0) \).

4. A particle is moving with the velocity of \( v(t) = 2t^2 + 2t - 12 \), where \( t \) is in terms of seconds.

   (a) What is the total displacement of the particle in the first 4 seconds?
   (b) What is the total distance traveled by the object in the first 4 seconds?