

1. Compute the following integral:

$$\int_1^4 \sqrt{t} \ln t \, dt$$

2. Compute the following integral:

$$\int_0^{\pi/4} \tan^4 \theta \sec^6 \theta d\theta$$

3. Compute the following integral:

$$\int \frac{10}{(x-1)(x^2+9)} dx$$

4. Compute the following integral:

$$\int \frac{1}{(5 - 4x - x^2)^{5/2}} dx$$

5. (a) Set up (but do not solve) the integral for the arc length along the curve  $x = y + y^3$  from  $y = 1$  to  $y = 4$ .

- (b) Set up (but do not solve) the integral for the surface area of the surface obtained by rotating the curve given by

$$x = a \cos^3 t, \quad y = a \sin^3 t, \quad 0 \leq t \leq \pi/2$$

about the  $x$ -axis. Here  $a$  is an arbitrary constant.

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18.01SC Single Variable Calculus  
Fall 2010

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