Show work or otherwise justify your answers. Unsupported answers (i.e. calculator output) will not receive full credit. You may check your answers with a calculator or computer.

1. (a) Set up (but do not evaluate) an integral expression for the mass of a cone of radius 3 cm and height 6 cm, if the density x centimeters from the axis of the cone is x + 2 grams per cubic centimeter. Hint: Use cylindrical shells.

(b (a) Set up (but do not evaluate) an integral expression for the mass of a planar disk of radius 5 cm if the density x centimeters from the center of the disk is 1 + x grams per square centimeter. Hint: Use concentric circles. 2. Find these integrals by making the indicated change of variables.

(a) 
$$\int_0^2 \frac{x}{x^2+1} dx$$
,  $u = x^2+1$ 

(b) 
$$\int_0^1 \frac{x}{\sqrt{2x+1}} \, dx, \ u = 2x+1$$

3. Integrate by parts. (a) 
$$\int x^2 \sin(x) dx$$

(b) 
$$\int x^2 \ln(x) dx$$