Chapter 6/7 Review Name_____

Integrate using either substitution or integration by parts.

1) $\int_1^e \frac{\ln x}{x}\,dx$

2) $\int 2x \ln x\,dx$

3) $\int \frac{\sqrt{2+\frac{1}{x^2}}}{x^3}\,dx$

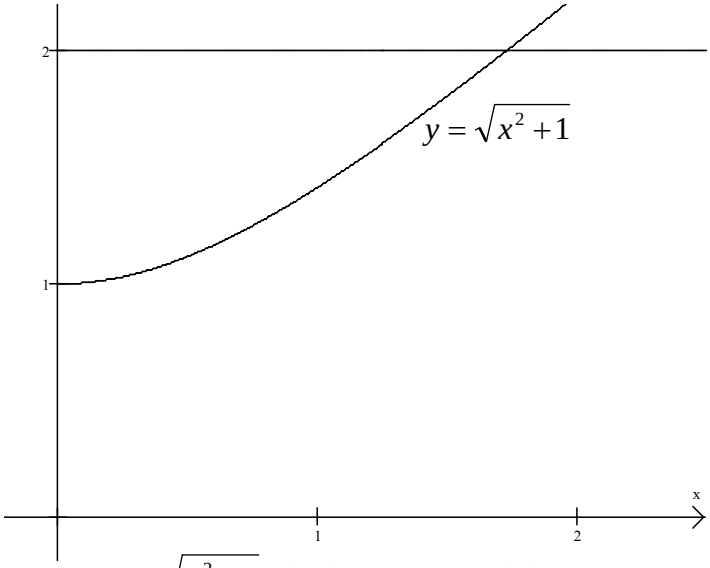
4) $\int_1^4 \frac{e^{\sqrt{x}}}{\sqrt{x}}\,dx$

5) $\int x^2 \cos x\,dx$

6) $\int_0^1 \frac{\tan^{-1} x}{1+x^2}\,dx$

7) $\int \frac{dx}{\sqrt{x}(2+\sqrt{x})}$

8) $\int_0^1 \frac{x}{x+1}\,dx$



Read each question carefully.

1) Identify the region bounded by the curve $y = \sqrt{x^2+1}$, the line $y = 2$, and the y-axis. Indicating the method that you use each time, set up the integral to find

   (a) the area of the region

   (b) the volume when the region is rotated about the y-axis

   (c) the volume when the region is rotated about x-axis

   (d) the volume when the region is rotated about the line $y = 2$

2) Find each numeric answer for #1 using your calculator

3) The region in #1 is the base of a solid. Set up the integral to find the volume of the solid if the cross-sections perpendicular to the *x*-axis(sliced along the *y*-axis) are

(a) squares with a side on the *xy* plane

(b) rectangles in which the base is half the height

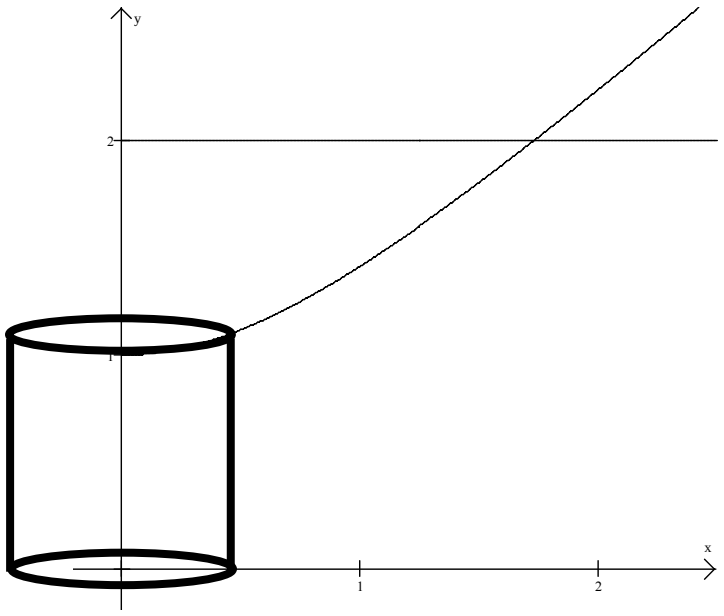
(c) isosceles right triangles in which one side is on the *xy* plane

(d) isosceles right triangles in which the hypotenuse is on the *xy* plane

(e) Circles with the diameter on the *xy* plane

4) Identify the region in the first quadrant bounded by the curve $y = \sqrt{x^2 + 1}$ and the line $x = 1$.

(a) Using the shell method, find the volume obtained when the region is rotated about the y axis. Do not use your calculator to find this answer.



(b) How will the shell method differ when rotating the region about the line $x = 1$? Set up this integral and use your calculator to find the volume.