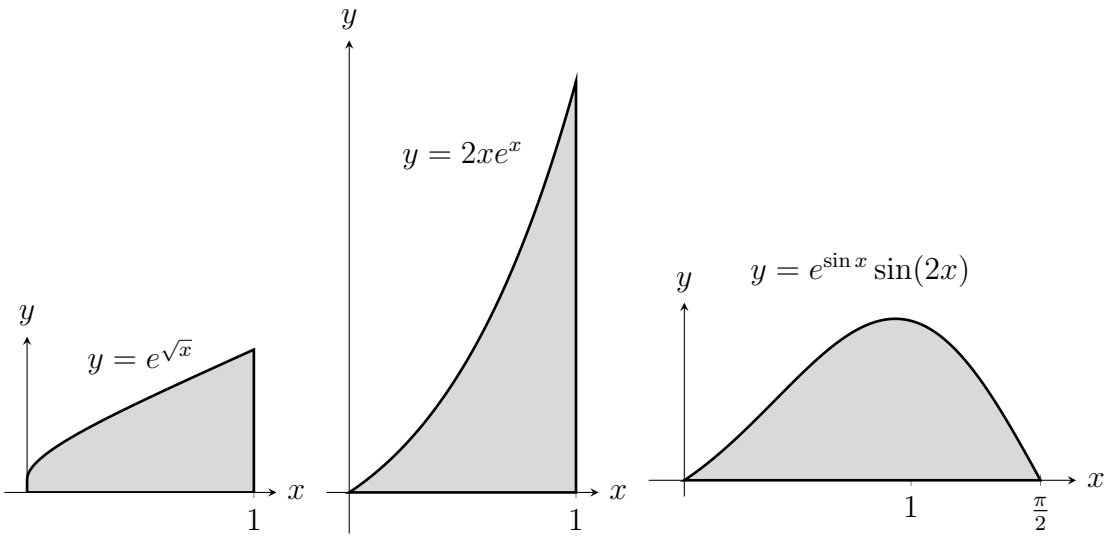
Turn in the following problems at the start of your Thursday recitation section. To receive full credit, please staple your work, and put your name, your section number, and the homework number at the top.

(1-4) Evaluate the following integrals:

1. $\displaystyle\int \frac{\cos(3\sqrt{x})}{\sqrt{x}}\,dx$
2. $\displaystyle\int \frac{1}{y + y\ln y}\,dy$
3. $\displaystyle\int \tan^2\theta \sec^2\theta\,d\theta$
4. $\displaystyle\int \sin x \cos^{10} x\,dx$

5. Evaluate the integral $\int_0^1 x^2\sqrt{1-x^6}\,dx$ by making a substitution and interpreting the resulting integral as the area of a familiar geometric shape.

6. Which of the following areas are equal? Why?



[Hint: Use u/du-substitution. It may be helpful to recall that $\sin(2x) = 2\sin x\cos x$.]

7. Alabama Instruments Company has set up a production line to manufacture a new calculator. The rate of production of these calculators after t weeks is

$$\frac{dx}{dt} = 5000\left(1 - \frac{100}{(t+10)^2}\right) \text{ calculators/week.}$$

(Notice that production approaches 5000 calculators per week as time goes on, but the initial production is lower because of the workers' unfamiliarity with the new techniques.) Find the number of calculators produced from the beginning of the third week to the end of the fourth week.