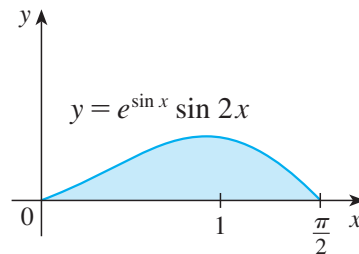
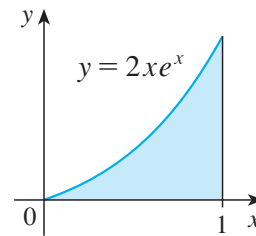
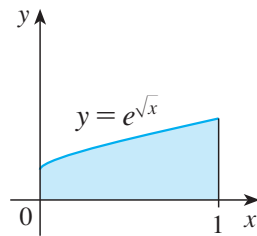


Due by 9am on October 20. Please upload your solutions to Canvas as one PDF file. Do not forget to attach the honor code. You must show all your work for full credit. Each problem is worth 10 points.

- (1) Evaluate the integral  $\int \sqrt{\cot x} \csc^2 x \, dx$
- (2) Evaluate the integral  $\int \frac{dt}{\cos^2 t \sqrt{1 + \tan t}}$
- (3) Which of the areas are equal? Why?



- (4) If  $f$  is continuous and  $\int_0^4 f(x) \, dx = 10$ , find  $\int_0^2 f(2x) \, dx$ .
- (5) Evaluate the integral  $\int \tan^{-1}(2y) \, dy$
- (6) Evaluate the integral  $\int e^{\sqrt{x}} \, dx$
- (7) Evaluate the integrals
- (a)  $\int_0^{\pi/2} \sin^7 \theta \cos^5 \theta \, d\theta$
- (b)  $\int_0^{2\pi} \sin^2\left(\frac{1}{3}\theta\right) \, d\theta$
- (c)  $\int_0^{\pi/4} \sec^6 \theta \tan^6 \theta \, d\theta$
- (d)  $\int_0^{\pi} \sin^2 t \cos^4 t \, dt$
- (8) Evaluate the integrals
- (a)  $\int_0^{\pi/2} \cos 5t \cos 10t \, dt$
- (b)  $\int \sin 2\theta \sin 6\theta \, d\theta$
- (c)  $\int \sin 8x \cos 5x \, dx$
- (d)  $\int_{-\pi}^{\pi} \sin mx \cos nx \, dx$ , where  $m, n \in \mathbb{Z}^+$ .
- (9) Find the average value of the function  $f(x) = \sin^2 x \cos^3 x$  on the interval  $[-\pi, \pi]$ .
- (10) A particle moves on a straight line with velocity function  $v(t) = \sin \omega t \cos^2 \omega t$ . Find its position function  $s = f(t)$  if  $f(0) = 0$ .