

1. Evaluate each of the following integrals.

(a)  $\int_{-3}^5 \frac{1}{5x+63} dx$

(f)  $\int (1 + \sec(x))^2 dx$

(b)  $\int \frac{5x}{x^2+4} dx$

(g)  $\int 3^{4x+2} dx$

(c)  $\int_0^2 xe^{-x^2} dx$

(h)  $\int \frac{2^{\frac{1}{x}}}{x^2} dx$

(d)  $\int \frac{\ln(x)}{x} dx$

(i)  $\int \left(\frac{1}{5}\right)^x dx$

(e)  $\int \frac{4e^{\sqrt{x+5}}}{\sqrt{x+5}} dx$

(j)  $\int x^{\frac{1}{5}} dx$

2. Find the derivative of each of the following functions.

(a)  $f(x) = 7^{x^2-3x+2}$

(c)  $f(x) = x \log(x + 1)$

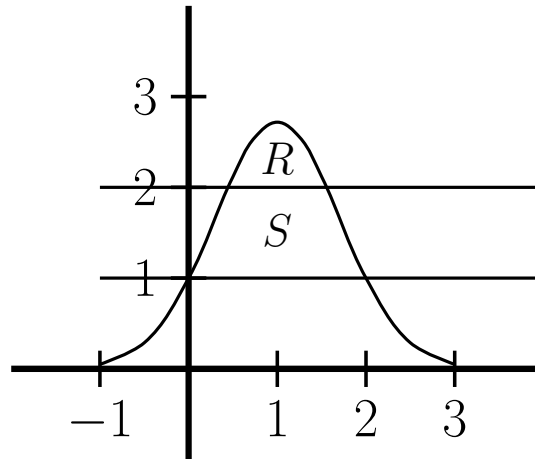
(b)  $f(x) = (x + 3)2^x$

(d)  $f(x) = 2^x \log_2 \left| \frac{x^2 + 2x + 2}{2} \right|$

3. Do #12 in section 7.6 (page 422). Round to the nearest tenth of a gram.

4. Do #18 in section 7.6 (page 422).

5. (From the 2007 AP Calculus AB exam) Let  $R$  be the region bounded by the graph of  $y = e^{2x-x^2}$  and the horizontal line  $y = 2$ , and let  $S$  be the region bounded by the graph of  $y = e^{2x-x^2}$  and the horizontal lines  $y = 1$  and  $y = 2$ , as shown below.



- (a) Set up, but do not evaluate, an integral expression that gives the area of  $R$ .
- (b) Set up, but do not evaluate, an integral expression that gives the area of  $S$ .
- (c) Set up, but do not evaluate, an integral expression that gives the volume of the solid generated when  $R$  is rotated about the horizontal line  $y = 1$ .