1. Evaluate the definite integral.

   (a) $\displaystyle\int_{1}^{2} \frac{x^2 + 1}{\sqrt{x}}\,dx$

   (b) $\displaystyle\int_{1}^{8} \sqrt[3]{x}(x^2 - \sqrt{x})\,dx$

   (c) $\displaystyle\int_{-1}^{2} |x - x^2|\,dx$

   (d) $\displaystyle\int_{4}^{9} \left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)^2 dx$

   (e) $\displaystyle\int_{0}^{1} \left(x^2 + 1 + \frac{1}{x^2 + 1}\right) dx$

   (f) $\displaystyle\int_{\pi/2}^{\pi} \sec x \tan x\,dx$

2. If $f(3) = 12$, f' is continuous, and $\displaystyle\int_{3}^{5} f'(x)\,dx = 20$, what is the value of $f(5)$?

3. Find the integral.

   (a) $\displaystyle\int e^{2016x}\,dx$

   (b) $\displaystyle\int_{2}^{4} \sin(4\pi x)\,dx$

   (c) $\displaystyle\int_{0}^{\pi/2} \cos^7 x \sin(2x)\,dx$

   (d) $\displaystyle\int_{0}^{1} x^4 e^{9x^5 - 8}\,dx$

   (e) $\displaystyle\int \frac{15x^2 + 50x}{x^3 + 5x^2 + 8}\,dx$

   (f) $\displaystyle\int \frac{dx}{x\sqrt[3]{\ln x}}$

(g) $\displaystyle\int \frac{\cos\sqrt{x}}{\sqrt{x}}dx$

(h) $\displaystyle\int_0^1 (4x^3 + 1)(x^4 + x)^5 dx$

(i) $\displaystyle\int \frac{dx}{x\sqrt[3]{\ln x}}$

(j) $\displaystyle\int x^5 \sqrt{4 + x^3}dx$

(k) $\displaystyle\int_0^4 \frac{x}{\sqrt{1 + 2x}}dx$

4. If f is continuous and $\int_0^8 f(u)du = 3$, find $\int_0^2 x^2 f(x^3)dx$ by making an appropriate substitution.