1. Evaluate the integral.

(a) $\displaystyle\int \left(\sqrt{2}t - \frac{5}{t} + 2\sqrt{t}\right)\, dt$

(b) $\displaystyle\int \left(u^{3/2} + \frac{6}{5\sqrt{u}} - 14e^{7u}\right)\, du$

(c) $\displaystyle\int \left(\sqrt{x} - \frac{4}{x^2} + \frac{2}{x}\right)\, dx$

(d) $\displaystyle\int \left(\frac{3}{x^2} - 2e^x + 7x + 3\right)\, dx$

(e) $\displaystyle\int \left(\frac{4}{x^5} - \frac{5}{\sqrt[3]{x}} + 2e^{x/5}\right)\, dx$

(f) $\displaystyle\int \left(\frac{3}{4t^3} - \frac{6}{\sqrt[3]{t}} + \frac{1}{\sqrt[3]{t^2}}\right)\, dt$

(g) $\displaystyle\int_1^2 \left(x^3 - x\right)\, dx$

(h) $\displaystyle\int_1^9 9x^2 - \frac{2}{3\sqrt{x}}\, dx$

(i) $\displaystyle\int_1^2 \left(4 + 10x - 3x^2\right)\, dx$

(j) $\displaystyle\int_{-1}^1 \left(10x^5 - 4x^3\right)\, dx$

(k) $\displaystyle\int_{e^2}^{e^5} \frac{1}{3x}\, dx$

(l) $\displaystyle\int_9^{25} \left(\frac{3}{\sqrt{t}} + 2\right)\, dt$

(m) $\displaystyle\int_0^2 (x+1)(x^2-5)\, dx$

2. Compute the derivative.

(a) $f(x) = \sqrt{x^3 e^x + 1}$

(b) $z = \dfrac{y\ln(y)}{y^2+5}$

(c) $g(t) = \ln\left(\sqrt{t^3 - 2t + 1}\right)$

(d) $y = xe^{x^3} + \ln\left(2 + 4x^5\right)$

(e) $g(t) = \dfrac{e^{3t-4}}{\sqrt{2t+9}}$

(f) $Q(r) = (\ln(r))^3\left(e^{4r^2} + 2r\right)^5$

(g) $f(x) = (1 + 2x\ln(x))^6$

(h) $f(t) = \sqrt{\ln(t^2 - 3t) + 7}$

(i) $u = \dfrac{e^x \ln x}{x^2 + \frac{1}{x} - 7}$

(j) $y = \dfrac{\ln(x^2 - 4x)}{(x^5)(\sqrt{3x+1})}$

(k) $h(v) = \dfrac{v^2 + 3v}{v^3 - 5v} + ve^{2v}$

(l) $g(t) = \dfrac{e^{(t^2-3t)}}{(2t+1)^{1/5}}$

(m) $m(v) = \ln(\sqrt{v}e^{v^3} - v^2)$

(n) $A(t) = (6t^3 + \ln t)^7 + \ln(t + e^t)$

(o) $y = \dfrac{4xe^x - \ln(x^2+3)}{x^5}$

(p) $f(x) = \left[1 + (\ln x)^3\right]^5$

(q) $A(m) = \displaystyle\int_0^m e^x - \frac{5}{\sqrt{x}}\, dx$