

1. For each problem, find two different functions that have the given derivative.

(a)  $\frac{dy}{dx} = 3$

(b)  $\frac{dy}{dx} = 3x^2$

(c)  $\frac{dw}{dx} = 8x^3 - x^2 + 5x - 10$

(d)  $\frac{dh}{dt} = \frac{4}{t}$

(e)  $\frac{dy}{dx} = 30e^x + 5$

(f)  $\frac{dq}{dt} = 50e^{-t}$

(g)  $\frac{dP}{dt} = t^3 + \frac{1}{t^3}$

(h)  $\frac{dy}{dx} = \frac{1}{x+4}$

(i)  $\frac{dz}{dy} = e^{3y}$

(j)  $\frac{dv}{dr} = \frac{100}{e^r}$

(k)  $\frac{ds}{dt} = 4e^t + 3e^{-t}$

(l)  $\frac{dP}{dt} = \frac{1}{\sqrt{t}}$

(m)  $\frac{dP}{dt} = \frac{2}{t} - \frac{3}{t^2}$

(n)  $\frac{dh}{ds} = 30e^{2s} + e^{3s}$

(o)  $\frac{dP}{dt} = 5e^{0.05t}$

(p)  $\frac{dy}{dx} = xe^{x^2}$

(q)  $\frac{dy}{dx} = 8x(x^2 + 1)^3$

(r)  $\frac{dy}{dx} = 12x^2\sqrt{x^3 + 7}$

(s)  $\frac{dy}{dx} = -3xe^{-0.25x^2}$

2. Evaluate the following indefinite integrals

(a)  $\int 3 dx$

(b)  $\int 3x^2 dx$

(c)  $\int (8x^3 - x^2 + 5x - 10) dx$

(d)  $\int \frac{4}{t} dx$

(e)  $\int (30e^x + 5) dx$

(f)  $\int 50e^{-t} dt$

(g)  $\int \left(t^3 + \frac{1}{t^3}\right) dt$

(h)  $\int \frac{1}{x+4} dx$

(i)  $\int e^{3y} dy$

(j)  $\int \frac{100}{e^r} dr$

(k)  $\int (4e^t + 3e^{-t}) dt$

(l)  $\int \frac{1}{\sqrt{t}} dt$

(m)  $\int \left(\frac{2}{t} - \frac{3}{t^2}\right) dt$

(n)  $\int (30e^{2s} + e^{3s}) ds$

(o)  $\int 5e^{0.05t} dt$

(p)  $\int xe^{x^2} dx$

(q)  $\int 8x(x^2 + 1)^3 dx$

(r)  $\int 12x^2\sqrt{x^3 + 7} dx$

(s)  $\int -3xe^{-0.25x^2} dx$