

1. Find  $f'(x)$  for the following functions. You do not need to simplify your answers.

a)  $f(x) = 2\sqrt{x} + \tan x$

b)  $f(x) = e^{2x} \sin x$

c)  $f(x) = \frac{\ln x}{x^2 + 1}$

d)  $f(x) = x^{3x}$

e)  $f(x) = \int_1^x \sqrt{1 + \cos^2 t} dt$

f)  $f(x) = \cos^3(2x) + \sec(2x)$

g)  $f(x) = (x^2 + x + 1)^{2/3}$

2. Find  $f'(x)$  for the following functions. You do not need to simplify your answers.

a)  $f(x) = e^x + \sqrt{x} - \tan x$

b)  $f(x) = (x^2 + 3x + 1) \sin x$

c)  $f(x) = \frac{1 + \ln x}{x + \cos x}$

d)  $f(x) = (x^2 + 3x - 1)^{2/3}$

e)  $f(x) = x^{\sin x}$

f)  $f(x) = \int_1^x \frac{dt}{\sin^2 t + 1}$

3. Find  $dy/dx$  for the following functions. You do not need to simplify your answers.

a)  $y = (x^2 + 2x - 1)e^{3x}$

b)  $y = \frac{3x \sin x}{4x^3 - x^2 + 1}$

c)  $y = \cos^2(3x) + \sec(3x)$

d)  $y = \ln \left( \frac{x^2}{\sqrt{x^2 + 1}} \right)$

e)  $2x + y^2 + \sin(x + y) = 3$

f)  $y = x^{2x}$

g)  $y = \int_1^x e^{t^2} dt$

4. Find  $f'(x)$  for the following functions. (You do not need to simplify your answers.)
- a)  $f(x) = x^2 + 2 \tan^{-1} x + 3 \tan 5x$
  - b)  $f(x) = (\sinh x)(1 + e^x)$
  - c)  $f(x) = \frac{\sin x - 1}{5 + 3e^x}$
  - d)  $f(x) = (3x^3 + 5x - 4)^{3/5}$
  - e)  $f(x) = x^{\ln x}$
  - f)  $f(x) = \int_1^x (t^3 + 1)^{1/2} dt$
5. Find  $f'(x)$  for the following functions. You do not need to simplify your answers.
- a)  $f(x) = e^x - \sqrt{x} + \cot x$
  - b)  $f(x) = (x^2 + 5x + 2) \cosh x$
  - c)  $f(x) = \frac{1 + \ln x}{x + \sin x}$
  - d)  $f(x) = (x^2 + 4x - 1)^{2/3}$
  - e)  $f(x) = x^{\sin x}$
  - f)  $f(x) = \int_1^x \frac{dt}{\sin^2 t + 1}$
6. Let  $y(x)$  be defined implicitly by  $3x + y^2 + \cos(x + y) = 100$ . Find  $y'(x)$ .
7. Let  $y(x)$  be defined implicitly by  $x^2 + \ln(x + y) = y$ . Find  $y'(x)$ .
8. Let  $y(x)$  be defined implicitly by  $x^2 + y^3 = e^y$ . Find  $y'(x)$ .
9. Let  $y(x)$  be defined implicitly by  $x^3 + \ln(x + y) = y$ . Find  $y'(x)$ .