

## Quiz 1

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

**Question 1.** (1 mark each) Differentiate the following functions:

a.

$$f(x) = \frac{1}{x^{1/3}} = x^{-1/3} \quad f'(x) = -\frac{1}{3} x^{-4/3}$$

b.

$$f(x) = \sin x \quad f'(x) = \cos x$$

c.

$$f(x) = \cot x \quad f'(x) = -\csc^2 x$$

d.

$$f(x) = \ln x \quad f'(x) = \frac{1}{x}$$

e.

$$f(x) = \sec x \quad f'(x) = \sec x \tan x$$

f.

$$f(x) = \operatorname{arcsec} x \quad f'(x) = \frac{1}{x \sqrt{x^2 - 1}}$$

**Question 2.** (2 marks each) Differentiate the following functions (do not simplify):

a.

$$f(x) = \arcsin(\arctan x) \quad f'(x) = \frac{1}{\sqrt{1 - (\arctan x)^2}} \cdot \frac{1}{1 + x^2}$$

b.

$$f(x) = \cot 2x \sec 3x$$

$$f'(x) = -\csc^2 2x \cdot 2 \cdot \sec 3x + \cot 2x \sec 3x \tan 3x \cdot 3$$