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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.

$$f(x) = \frac{1}{x^{-1/5}} = x^{1/5} \qquad f'(x) = \frac{1}{5} x^{-4/5}$$

b.

$$f(x) = \text{arccsc} x \qquad f'(x) = \frac{-1}{x\sqrt{x^2 - 1}}$$

c.

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

d.

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

e.

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

f.

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

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

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

$$f'(x) = \cos x \, e^{\arctan x} + \sin x \, e^{\arctan x} \frac{1}{1 + x^2}$$

Question 3. *(2 marks)* Differentiate the following functions *(do not simplify)*:

$$f(x) = \sqrt{\frac{\arcsin 2x}{\csc 3x}}$$

$$f'(x) = \frac{1}{2}\left(\frac{\arcsin 2x}{\csc 3x}\right)^{-\frac{1}{2}} \cdot \frac{\frac{1}{\sqrt{1-(2x)^2}} \cdot 2 \csc 3x - \arcsin 2x (-\csc 3x \cot 3x) \cdot 3}{(\csc 3x)^2}$$