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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.
$$f(x) = \frac{1}{x^{11/8}} = x^{-11/8} \qquad f'(x) = -\frac{11}{8} x^{-19/8}$$

b.
$$f(x) = \cos x \qquad f'(x) = -\sin x$$

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

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

a.
$$f(x) = x(\arctan(\csc x)) \qquad f'(x) = \arctan(\csc x) + x \frac{1}{1+(\csc x)^2} \cdot -\csc x \cot x$$

b.
$$f(x) = \sqrt[3]{\tan 2x \, e^{3x}}$$

$$= \left(\tan 2x \, e^{3x}\right)^{1/3}$$

$$f'(x) = \frac{1}{3}\left(\tan 2x \, e^{3x}\right)^{-2/3}\left[\sec^2(2x)\cdot 2 \cdot e^{3x} + \tan(2x)e^{3x}\cdot 3\right]$$