

Ph1105 Problem Sheet E

1. Differentiate the following functions with respect to x

- (i) $y = e^{x \tan x}$
- (ii) $y = \cos(\ln x)$
- (iii) $y = x^3 \log_2(3 - 2x)$
- (iv) $y = e^{\sqrt{1+5x^3}}$.
- (v) $y = \ln(\cos e^x)$

2. Find dy/dx in each of the following cases

- (i) $y = e^{1/x}$
- (ii) $y = 3^{-x}$
- (iii) $y = \pi^{\sin x}$.
- (iv) $y = x^{\sin x}$.
- (v) $e^{xy} + x = 1$.

3. Evaluate each of the following integrals

- (i) $\int_0^{\frac{\pi}{4}} e^{\tan x} \sec^2 x dx$
- (ii) $\int_0^1 e^{2x} \sqrt{1 + e^{2x}} dx$
- (iii) $\int_0^1 \frac{e^x dx}{e^x + 10}$.