

DIFFERENTIATION & APPLICATIONS (Q 6 & 7, PAPER 1)

LESSON NO. 9: DIFFERENTIATING FROM FIRST PRINCIPLES

2006

6 (c) Prove by induction that $\frac{d}{dx}(x^n) = nx^{n-1}$, $n \geq 1$, $n \in \mathbf{N}$.

2005

7 (a) Find from first principles the derivative of x^2 with respect to x .

2004

6 (b) (ii) Differentiate, from first principles, $\cos x$ with respect to x .

2002

6 (b) (i) Prove, from first principles, the addition rule:

$$\text{if } f(x) = u(x) + v(x) \text{ then } \frac{df}{dx} = \frac{du}{dx} + \frac{dv}{dx}.$$

2001

6 (b) (ii) Now, find from first principles the derivative of \sqrt{x} with respect to x .