C3 Differentiation

P2 Specimen 2001/2

2. Differentiate the following with respect to x, simplifying your answers as far as possible.

(a) $\dfrac{2x}{x^2+1}$ *(b)* $x^2 \tan 2x$ [3],[2]

(c) $\dfrac{1}{\sqrt{3x^2+2}}$ [3]

P2 June 2001

1. Differentiate the following with respect to x.

(a) $\dfrac{e^{2x}}{x+1}$ [3]

(b) $x^2 \sin 3x$ [3]

(c) $\sqrt{1+\tan x}$ [2]

P2 May 2002

3. *(a)* Differentiate the following with respect to x.

(i) $(1+e^{2x})^5$ (ii) $\dfrac{x^2}{\tan x}$ [5]

(b) The curve C is given by

$$y = \cos 2x + x + 1.$$

Find the x-coordinates and nature of the stationary points of C for $0 \leqslant x \leqslant \frac{\pi}{2}$. [8]

P2 May 2003

9. *(a)* Differentiate the following with respect to x.

(i) $(1+4\tan x)^6$ (ii) $x^2 \ln(3x+1)$ [5]

(b) Given that

$$y = \frac{e^x + 2x}{x+2},$$

show that

$$\frac{dy}{dx} = \frac{(x+1)e^x + 4}{(x+2)^2}.$$ [3]

P2 May 2004

3. Differentiate the following with respect to x.

(a) $\dfrac{4x^2}{x^3+1}$ *(b)* $x^2 \tan x$ *(c)* $\dfrac{1}{\sqrt{2x^4+3}}$ [3],[2],[3]

p.t.o.