We see that after deriving the elements, we end up with:

$$\frac{d}{dx}\exp(x) = \exp(x)$$

□

Moving on to the sinus function with (2)

$$(2.1)\quad \frac{d}{dx}\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$

again doing the derivative element by element

$$(2.2)\quad \frac{d}{dx}x = 1$$

$$(2.3)\quad \frac{d}{dx}\frac{x^3}{3!} = \frac{3x^2}{3!} = \frac{x^2}{2!}$$

$$(2.4)\quad \frac{d}{dx}\frac{x^5}{5!} = \frac{5x^4}{5!} = \frac{x^4}{4!}$$

putting (2.2), (2.3) and (2.4) into (2.1)

$$\frac{d}{dx}\sin(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \dots$$

We see

$$\frac{d}{dx}\sin(x) = \cos(x)$$

□

Lastly the cosine function with (3)

$$(3.1)\quad \frac{d}{dx}\cos(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots$$

element by element derivatives

$$(3.2)\quad \frac{d}{dx}1 = 0$$

$$(3.3)\quad \frac{d}{dx}\frac{x^2}{2!} = \frac{2x}{2!} = \frac{x}{1!}$$

$$(3.4)\quad \frac{d}{dx}\frac{x^4}{4!} = \frac{4x^3}{4!} = \frac{x^3}{3!}$$

$$(3.5)\quad \frac{d}{dx}\frac{x^6}{6!} = \frac{6x^5}{6!} = \frac{x^5}{5!}$$

giving (3.2), (3.3), (3.4) and (3.5) their appropriate spaces in (3.1)