

Calculus Review

$$\textcircled{1} \sum_{j=1}^{\infty} x^j = \frac{x}{1-x}$$

Why?

$$\sum_{j=1}^{\infty} x^j = x + x^2 + x^3 + x^4 + \dots$$

$x = 5/6$ so
sum
convergent

$$= x(1 + x + x^2 + x^3 + \dots)$$

$$= x \frac{(1-x)(1+x+x^2+x^3+\dots)}{(1-x)}$$

$$= \frac{(x)(1)}{1-x}$$

$$= \frac{x}{1-x}$$

$$\textcircled{2} \frac{d}{dx} \frac{x}{1-x} = \frac{1}{(1-x)^2}$$

Why? Quotient rule

$$\frac{d}{dx} \frac{x}{1-x} = \frac{(1-x)(1) - (x)(-1)}{(1-x)^2}$$

$$= \frac{1}{(1-x)^2}$$

$$\frac{d}{dx} \frac{H1}{H0} = \frac{H0 \textcircled{DE} H1 - H1 \textcircled{DE} H0}{(H0)^2}$$

deriv of numer. deriv of denom squared.