

(b) Write the equation of the line tangent to the graph of $y = \frac{e^{-x}}{1+e^x}$ at $x=0$.

$$y - y_1 = \overset{\text{slope}}{(m)}(x - x_1)$$

$$y - y_1 = \frac{1}{4}(x - 0)$$

نعوض في المعادلة الأصلية
 $\therefore y_1 = \frac{e^0}{1+e^0} = \frac{1}{2}$

$$y - \frac{1}{2} = -\frac{1}{4}x$$

$$\rightarrow y = -\frac{1}{4}x + \frac{1}{2}$$

43 If \$P\$ is invested for (n) years at 10% compounded continuously, the future value that results after n years is given by the function.

$$S = Pe^{0.1n}$$

(a) At what rate is the future value growing at any time (for any nonnegative n)?

$$\begin{aligned} \text{rate} \rightarrow S' &= P(0.1)e^{0.1n} \\ &= 0.1Pe^{0.1n} \end{aligned}$$

(b) At what rate is the future value growing after 1 year

$$S' \underset{[n=1]}{=} = 0.1Pe^{0.1(1)} = \underline{\underline{0.11P}}$$