Mixed Exercise 9.01 Differentiation (Year 2 Pure Maths)

1 *(2 marks)*

Given that $y = \dfrac{(1-x^2)e^{-x}}{1+x^2}$ $(|x| < 1)$, *Find* $\dfrac{dy}{dx}$ *when* $x = 0$. *(5 marks)*

Mixed Exercise 9.01 Differentiation (Year 2 Pure Maths)

2 *Find an expression in terms of x and y for $\frac{dy}{dx}$, given that:* *(3 marks)*

$(a)\ x^4 - y^4 = 2xy$ *(4 marks)*

$(b)\ x^2 + 6xy + y^2 = 5$

Mixed Exercise 9.01 Differentiation (Year 2 Pure Maths)

3 *Show that the normal to the curve* $y = \tan x$ *at the point A with coordinates* $\left(\frac{\pi}{4}, 1\right)$ *(3 marks)*

meets the $x-$*axis at the point B* $\left(\frac{\pi + 8}{4}, 0\right)$