Name: Solution

Student Number:

Problem 1

(a) Differentiate the function $y = 2x \sin x$.

$$y' = (2x)' \cdot \sin x + 2x \cdot (\sin x)'$$
$$\uparrow \text{ Product rule}$$
$$= 2 \cdot \sin x + 2x \cdot \cos x$$

(b) Find the slope of the tangent line to the curve $y = 2x \sin x$ at the point $(\frac{\pi}{2}, \pi)$.

Slope of the tangent line to the curve of $y = 2x \sin x$ at $(\frac{\pi}{2}, \pi)$ is

$$y'\Big|_{(\frac{\pi}{2}, \pi)} = 2 \cdot \sin(\frac{\pi}{2}) + 2 \cdot \frac{\pi}{2} \cdot \cos(\frac{\pi}{2})$$
$$= 2$$

(c) Find an equation of the tangent line to $y = 2x \sin x$ at the point $(\frac{\pi}{2}, \pi)$.

Equation :

$$y - \pi = 2(x - \frac{\pi}{2})$$

or $\quad y = 2x$