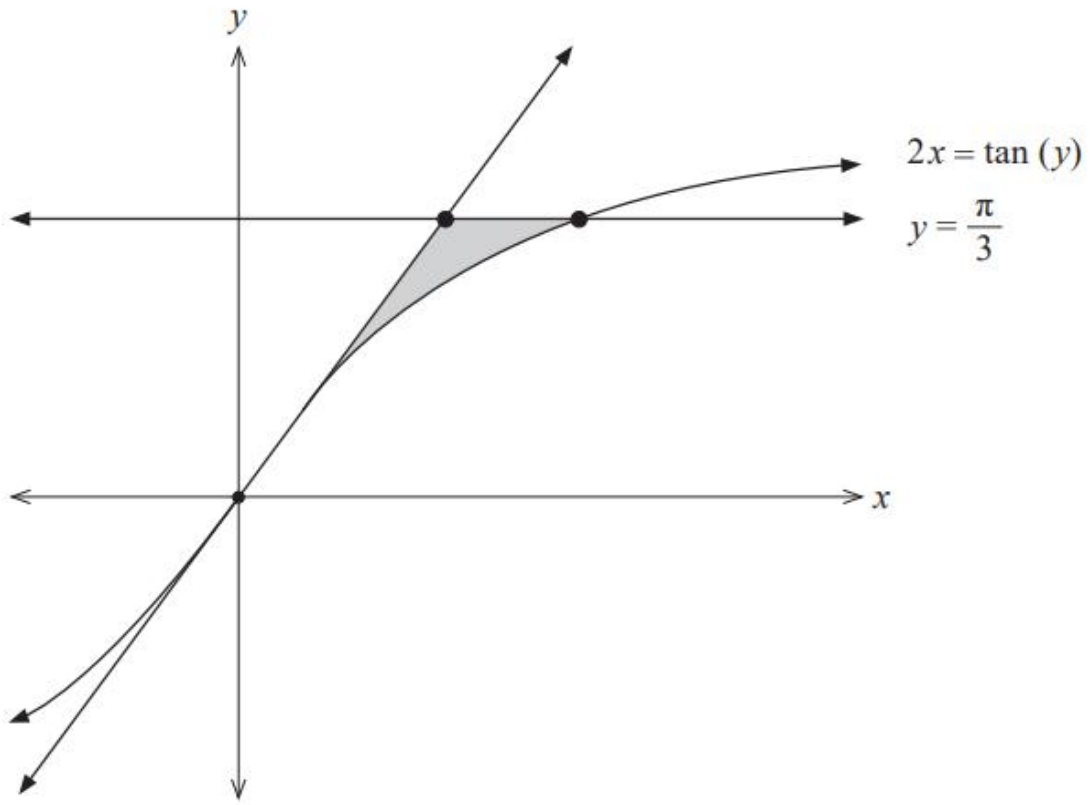
Question 7 **(8 marks)**

The graph of $2x = \tan(y)$ is shown along with the tangent at $x = 0$. The horizontal line $y = \frac{\pi}{3}$ is also shown.



(a) Using implicit differentiation, determine the equation of the tangent drawn at $x = 0$.

(3 marks)

The shaded region is bounded by the curve $2x = \tan(y)$, the tangent drawn and $y = \frac{\pi}{3}$.

(b) Write the expression for the area of the shaded region. (2 marks)

(c) Evaluate this area exactly. (3 marks)