3 Find the values of k for which the equation $x^2 + (k+9)x + 9 = 0$ has two distinct real roots. [4]

4 It is given that $y = \ln(1 + \sin x)$ for $0 < x < \pi$.

(a) Find $\frac{\mathrm{d}y}{\mathrm{d}x}$. [2]

© UCLES 2020

(b) Find the value of $\frac{dy}{dx}$ when $x = \frac{\pi}{6}$, giving your answer in the form $\frac{1}{\sqrt{a}}$, where a is an integer. [2]

(c) Find the values of x for which $\frac{dy}{dx} = \tan x$. [5]