4.(a)

$$\begin{array}{r} 3x-5 \\ x^2+0x+1\overline{\smash{)}3x^3-5x^2+7x-5} \end{array}$$

$$\underline{3x^3+0x^2+3x}$$

$$-5x^2+4x$$

$$\underline{-5x^2+0x-5}$$

$$4x$$

M1

$\underline{A=3}, \quad B=-5, C=4$ B1, A1

$D=0$ *   A1*

(4)

(b)

$$\int 3x-5+\frac{4x}{x^2+1}\,dx = \frac{3x^2}{2}-5x+2\ln(x^2+1)+c$$ M1, A1ft

$$\text{Area} = \left(\frac{3\times 3^2}{2}-5\times 3+2\ln(3^2+1)\right)-\left(\frac{3\times 2^2}{2}-5\times 2+2\ln(2^2+1)\right)$$

$$= \frac{5}{2}+\ln 4$$ dM1, A1

(4)

(8 marks)