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COMPUTER ENGINEERING

MATH 104

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maths 104 class work

$$d) \quad (11-3x) / (x^2 + 2x - 3)$$

$$\frac{11-3x}{x^2+2x-3}$$

$$\frac{11-3x}{x^2+2x-3} = \frac{11-3x}{(x-1)(x+3)}$$

$$\frac{11-3x}{(x-1)(x+3)} = \frac{A}{x-1} + \frac{B}{x+3}$$

$$11-3x = A(x+3) + B(x-1)$$

$$\text{let } x-1=0 \Rightarrow x=1$$

$$11-3(1) = A(1+3) + B(1-1)$$

$$11-3 = 4A$$

$$8 = 4A$$

$$A = 2$$

$$\text{let } x+3=0 \Rightarrow x=-3$$

$$11-3(-3) = A(-3+3) + B(-3-1)$$

$$11+9 = -4B$$

$$20 = -4B$$

$$-B = -5$$

$$\frac{11-3x}{(x-1)(x+3)} = \frac{2}{x-1} - \frac{5}{x+3} + C$$

$$\int \frac{11-3x}{x^2+2x-3} = \int \frac{2}{x-1} - \int \frac{5}{x+3} + C$$

$$2 \log_e |x-1| - 5 \log_e |x+3| = \log_e \frac{(x-1)^2}{(x+3)^5} + C$$

$$2(2x^2 - 9x - 39) / (x+1)(x-2)(x+3) = \frac{A}{x+1} + \frac{B}{x-2} + \frac{C}{x+3}$$

$$2x^2 - 9x - 39 = A(x-2)(x+3) + B(x+1)(x+3) + C(x+1)(x-2)$$

$$\text{Let } x+1=0 \Rightarrow x=-1$$

$$2(-1)^2 - 9(-1) - 39 = A(-1-2)(-1+3)$$

$$2+9-39 = -6A$$

$$10-39 = -6A$$

$$-29 = -6A$$

$$A = \frac{-29}{-6} = \frac{29}{6}$$

$$\text{Let } (x-2)=0 \Rightarrow x=2$$

$$2(2)^2 - 9(2) - 39 = B(2+1)(2+3)$$

$$8 - 18 - 39 = 15B$$

$$-49 = 15B$$

$$B = \frac{-49}{15}$$

$$B = -3$$

$$\text{Let } x+3=0 \Rightarrow x=-3$$

$$2(-3)^2 - 9(-3) - 39 = C(-3+1)(-3-2)$$

$$18 + 27 - 39 = 10C$$

$$10 = 10C$$

$$C = 1$$

$$\frac{2x^2 - 9x - 39}{(x+1)(x-2)(x+3)} = \frac{\frac{29}{6}}{x+1} - \frac{3}{x-2} + \frac{1}{x+3}$$

$$\int \frac{2x^2 - 9x - 39}{(x+1)(x-2)(x+3)} = \int \frac{29}{6(x+1)} - \int \frac{3}{x-2} + \int \frac{1}{x+3} + C$$

$$\frac{25}{6} \int \frac{1}{(x+1)} - 3 \int \frac{9}{x-2} + \int \frac{1}{x+3}$$

$$\frac{25}{6} \log_e(x+1) - 3 \log_e(x+2) + \log_e(x+3)$$

$$\log_e \frac{(x+1)^{\frac{25}{6}} (x+3)}{(x-2)^3} + C$$

$$3 \frac{1}{x^2+121} = \int \frac{1}{(x+11)^2} = \int (x+11)^{-2}$$

$$= \frac{(x+11)^{-1}}{-1}$$

$$= -\frac{1}{(x+11)} + C$$