ERCH 18/MAM/URGDO
19/ENGG02/017
MATH 104 Practice Question

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

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

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

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

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

let $x-1=0 \Rightarrow x=1$

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

$11-3 = 4A$

$8 = 4A$

$A = 2$

let $x+3=0 \Rightarrow x=-3$

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

$11+7 = -4B$

$18 = -4B$

$B = -.5$

2 $\frac{(2x^2-7x-35)}{(x+1)(x-2)(x+3)}$

$\frac{2x^2-7x-35}{(x+1)(x-2)(x+3)} = \frac{A}{(A+1)} + \frac{B}{(x+2)} + \frac{C}{x+3}$

$2x^2-9x-35 = A(x-2)(x+3) + B(x+1)(x+3) + C(x+1)(x-2)$

let $x+1=0 \Rightarrow x=-1$

$2(-1)^2 - 9(-1) - 35 = A(-1-2)(-1+3)$

$2+9-35 = -6A$

$10-35 = -6A$

$-25 = -6A$

$A = 25/6$

let $(x-2) = 0 \Rightarrow \alpha = 2$

$2(2)^2 - 7(2) - 35 = B(2+1)(2+3)$

$8 - 14 - 35 = 15B$

$-45 = 15B$

$B = -45/15$

$B = -3$

let $x+3 = 0 \Rightarrow x = -3$

$2(-3)^2 - 9(-3) - 35 = C(-3+1)(-3-2)$

$18 + 27 - 35 = 10C$

$10 = 10C$

$C = 1$

$$\frac{2x^2 - 9x - 35}{(x+1)(x+2)(x+3)} \equiv \frac{25}{6(x+1)} - \frac{3}{(x+2)} + \frac{1}{(x+3)}$$

$$\int \frac{2x^2 - 9x - 35}{(x+1)(x-2)(x+3)} = \int \frac{25}{6(x+1)} - \int \frac{3}{x-2} + \int \frac{1}{x+3}$$

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

$$\frac{25}{6} \log|x+1| - 3\log|x-2|$$

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

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

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