

## Section 3: Partial fractions

## Solutions to Exercise level 1

$$1. \quad (i) \quad \frac{1}{x(x+1)} \equiv \frac{A}{x} + \frac{B}{x+1}$$

$$1 \equiv A(x+1) + Bx$$

$$\text{Putting } x=0 \Rightarrow 1 = A$$

$$\text{Putting } x=-1 \Rightarrow 1 = -B \Rightarrow B = -1$$

$$\frac{1}{x(x+1)} \equiv \frac{1}{x} - \frac{1}{x+1}$$

$$(ii) \quad \frac{14x}{(2x-1)(x+3)} \equiv \frac{A}{2x-1} + \frac{B}{x+3}$$

$$14x = A(x+3) + B(2x-1)$$

$$\text{Putting } x=-3 \Rightarrow -42 = -7B \Rightarrow B = 6$$

$$\text{Putting } x = \frac{1}{2} \Rightarrow 7 = \frac{7}{2}A \Rightarrow A = 2$$

$$\frac{14x}{(2x-1)(x+3)} \equiv \frac{2}{2x-1} + \frac{6}{x+3}$$

$$2. \quad \frac{3x+2}{(x-1)(x+2)(2x+3)} \equiv \frac{A}{x-1} + \frac{B}{x+2} + \frac{C}{2x+3}$$

$$3x+2 \equiv A(x+2)(2x+3) + B(x-1)(2x+3) + C(x-1)(x+2)$$

$$\text{Putting } x=1 \Rightarrow 5 = 15A \Rightarrow A = \frac{1}{3}$$

$$\text{Putting } x=-2 \Rightarrow -4 = 3B \Rightarrow B = -\frac{4}{3}$$

$$\text{Putting } x = -\frac{3}{2} \Rightarrow -\frac{5}{2} = -\frac{5}{4}C \Rightarrow C = 2$$

$$\frac{3x+2}{(x-1)(x+2)(2x+3)} \equiv \frac{1}{3(x-1)} - \frac{4}{3(x+2)} + \frac{2}{2x+3}$$

$$3. \quad (i) \quad \frac{2x}{(x-1)^2} \equiv \frac{A}{x-1} + \frac{B}{(x-1)^2}$$

$$2x \equiv A(x-1) + B$$

$$\text{Putting } x=1 \Rightarrow 2 = B$$

$$\text{Equating coefficients of } x \Rightarrow 2 = A$$

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

$$(ii) \quad \frac{3x+2}{(2-3x)^2} \equiv \frac{A}{2-3x} + \frac{B}{(2-3x)^2}$$

$$3x+2 \equiv A(2-3x) + B$$

$$\text{Putting } x = \frac{2}{3} \Rightarrow 4 = B$$

## Edexcel A level Maths Algebra 3 Exercise solutions

Equating coefficients of  $x \Rightarrow 3 = -3A \Rightarrow A = -1$

$$\frac{3x+2}{(2-3x)^2} \equiv \frac{4}{(2-3x)^2} - \frac{1}{2-3x}$$