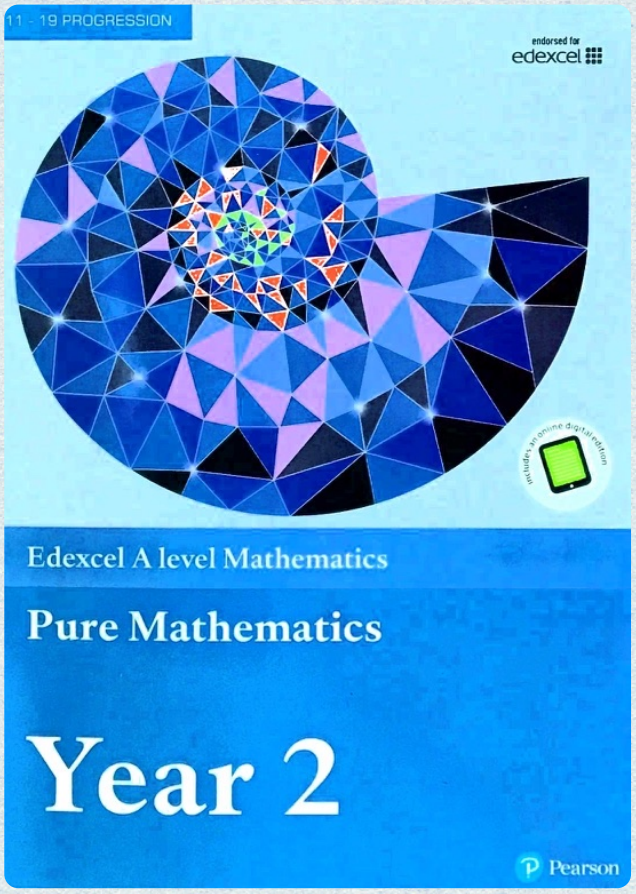

Chapter 1

Algebraic Methods

1.3 Partial Fractions 2

(E) **5** Given that, for $x < -1$, $\dfrac{-10x^2 - 8x + 2}{x(2x+1)(3x-2)} \equiv \dfrac{D}{x} + \dfrac{E}{2x+1} + \dfrac{F}{3x-2}$, where D, E and F are constants. Find the values of D, E and F. **(4 marks)**

$$-10x^2 - 8x + 2 \equiv D(2x+1)(3x-2) + Ex(3x-2) + Fx(2x+1)$$

$x = 0$

$$2 = D(1)(-2)$$
$$2 = -2D \qquad D = -1$$

$x = -\frac{1}{2}$

$$-\frac{5}{2} + 4 + 2 = E\left(-\frac{1}{2}\right)\left(-\frac{3}{2} - 2\right)$$
$$\frac{7}{2} = \frac{7}{4}E$$
$$\frac{7}{2} \times \frac{4}{7} = E$$
$$2 = E \qquad E = 2$$

$x = \frac{2}{3}$

$$-\frac{40}{9} - \frac{48}{9} + \frac{18}{9} = F\left(\frac{2}{3}\right)\left(\frac{4}{3} + 1\right)$$
$$-\frac{70}{9} = \frac{14}{9}F$$
$$-\frac{70}{9} \times \frac{9}{14} = F$$
$$-5 = F \qquad F = -5$$