Recap

Partial Fractions 1

Linear Factors

Express $\dfrac{1}{P(2P-1)}$ in partial fractions.

$$\frac{1}{P(2P-1)} \equiv \frac{A}{P} + \frac{B}{2P-1}$$

$$\frac{1}{P(2P-1)} \equiv \frac{A(2P-1) + B(P)}{P(2P-1)}$$

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

$P = \frac{1}{2}$ $\quad 1 = B\left(\frac{1}{2}\right)$

$2 = B$ $\qquad B = 2$

$P = 0$ $\quad 1 = A(2(0)-1)$

$1 = -A$ $\qquad A = -1$

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

Express $\dfrac{x}{(1+x)(1-2x)}$ in partial fractions.

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

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

$x = \frac{1}{2}$: $\quad \frac{1}{2} = B\left(1+\frac{1}{2}\right)$

$$\frac{1}{2} = \frac{3B}{2}$$

$$1 = 3B$$

$$\frac{1}{3} = B \qquad B = \frac{1}{3}$$

$x = -1$: $\quad -1 = A(1-2(-1))$

$$-1 = 3A$$

$$-\frac{1}{3} = A \qquad A = -\frac{1}{3}$$

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

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

$x = 0$: $\quad \frac{0}{1 \times 1} = -\frac{1}{3} + \frac{1}{3}$ ✓