Advanced Higher Mathematics – Methods in Algebra and Calculus
Unit Assessment Preparation - Further Practice Questions

Methods in Algebra and Calculus Assessment Standard 1.1

1. Express the following in partial fractions.

(a) $\dfrac{5x-11}{x^2-4x+3}$ (b) $\dfrac{4x+5}{x^2+3x+2}$ (c) $\dfrac{4x-10}{x^2-3x}$ (d) $\dfrac{6x-1}{4x^2-1}$ (e) $\dfrac{4x+1}{2x^2+3x+1}$

(f) $\dfrac{x^2-9x-2}{(x+1)(x-1)^2}$ (g) $\dfrac{3x^2-11x+5}{(x-2)(x-1)^2}$ (h) $\dfrac{4x^2+9}{(x-2)(x+3)^2}$ (i) $\dfrac{16}{(x+1)(x-3)^2}$ (j) $\dfrac{5x+1}{x(2x+1)^2}$

(k) $\dfrac{4x^2-3x+2}{(x-1)(x^2+x+1)}$ (l) $\dfrac{x^2-10x-8}{(x-2)(x^2+2x+4)}$ (m) $\dfrac{3x-2}{x(x^2+2)}$ (n) $\dfrac{x^2+2x+9}{(x-1)(x^2+3)}$

Answers:

1 **(a)** $\dfrac{3}{x-1}+\dfrac{2}{x-3}$ **(b)** $\dfrac{1}{x+1}+\dfrac{3}{x+2}$ **(c)** $\dfrac{10}{3x}+\dfrac{2}{3(x-3)}$ **(d)** $\dfrac{1}{2x-1}+\dfrac{2}{2x+1}$

(e) $\dfrac{3}{x+1}+\dfrac{2}{2x+1}$ **(f)** $\dfrac{2}{x+1}-\dfrac{1}{x-1}-\dfrac{5}{(x-1)^2}$ **(g)** $\dfrac{8}{x-1}-\dfrac{5}{x-2}+\dfrac{3}{(x-1)^2}$

(h) $\dfrac{1}{x-2}+\dfrac{3}{x+3}-\dfrac{9}{(x+3)^2}$ **(i)** $\dfrac{1}{x+1}-\dfrac{1}{x-3}+\dfrac{4}{(x-3)^2}$ **(j)** $\dfrac{1}{x}-\dfrac{2}{2x+1}+\dfrac{3}{(2x+1)^2}$

(k) $\dfrac{1}{x-1}+\dfrac{3x-1}{x^2+x+1}$ **(l)** $\dfrac{3x}{x^2+2x+4}-\dfrac{2}{x-2}$ **(m)** $\dfrac{x+3}{x^2+2}-\dfrac{1}{x}$ **(n)** $\dfrac{3}{x-1}-\dfrac{2x}{x^2+3}$