

ALGEBRAIC METHODS MARKING SCHEME

1.

(a)	Any correct constant, so for $A = 2$ or $B = 3$ or $C = -1$ or $D = 5$	B1
	$2x^4 + 15x^3 + 35x^2 + 21x - 4 = Ax^2(x+3)^2 + Bx(x+3)^2 + C(x+3)^2 + D$ $\Rightarrow A = \dots, B = \dots, C = \dots, D = \dots$ or $2x^4 + 15x^3 + 35x^2 + 21x - 4 \div (x^2 + 6x + 9) = \dots x^2 + \dots x + \dots + \frac{\dots}{(x+3)^2}$	M1
	2 correct of $A = 2, B = 3, C = -1, D = 5$	A1
	$A = 2, B = 3, C = -1, D = 5$	A1
		(4)

2.

(a)	$2x^3 - 4x - 15 = (Ax + B)(x^2 + 3x + 4) + C(2x + 3) \Rightarrow A = \dots \text{ or}$ $x^2 + 3x + 4 \overline{) 2x^3 + 0x^2 - 4x - 15}$ $2x^3 + \dots$	M1
	$A = 2$	A1
	$B = -6, C = 3$	A1A1
		(4)

3.

(a)	$2x^2 - 3x - 5 = (2x - 5)(x + 1)$	B1
	$3 - \frac{x-2}{x+1} + \frac{5x+26}{2x^2-3x-5} = \frac{3(x+1)(2x-5) - (x-2)(2x-5) + 5x+26}{(x+1)(2x-5)}$	M1 A1
	$= \frac{(4x+1)(x+1)}{(x+1)(2x-5)} = \frac{4x+1}{2x-5}$	A1
		(4)

4.

2	$g(x) = \frac{2x^2 - 5x + 8}{x - 2}$		
(a)	Sets $2x^2 - 5x + 8 = (Ax + B)(x - 2) + C$ with an attempt at one constant Attempts all 3 constants. E.g. Sets $x = 2 \Rightarrow C = \dots, -2B + C = 8 \Rightarrow B = \dots$ and compares x^2 terms gives $A = \dots$ $2x - 1 + \frac{6}{x - 2}$	M1 dM1 A1	(3)
5.			
(a)	$ \begin{array}{r} x^2 + 2 \\ x^2 - x - 12 \overline{) x^4 - x^3 - 10x^2 + 3x - 9} \\ \underline{x^4 - x^3 - 12x^2} \\ 2x^2 + 3x - 9 \\ \underline{2x^2 - 2x - 24} \\ 5x + 15 \\ \underline{5x - 20} \\ 35 \end{array} $ $\frac{x^4 - x^3 - 10x^2 + 3x - 9}{x^2 + x - 12} \equiv x^2 + 2 + \frac{5(x + 3)}{(x - 4)(x + 3)}$ $\equiv x^2 + 2 + \frac{5}{(x - 4)} \text{ or stating } P = 2, Q = 5$	M1A1 M1 A1	(4)
6.			
(a)	$\frac{4x^3 + 2x^2 + 3x + 8}{x^2 + 4} \equiv Ax + B + \frac{Cx + D}{x^2 + 4}$		
(i)	Any correct value of $A = 4, B = 2$ or $C = -13$ Full method to find values for A, B and C E.g. $4x^3 + 2x^2 + 3x + 8 \equiv (Ax + B)(x^2 + 4) + Cx + D$ $ \begin{array}{r} 4x + 2 \\ x^2 + 0x + 4 \overline{) 4x^3 + 2x^2 + 3x + 8} \\ \underline{4x^3 + 0x^2 + 16x + 8} \\ -13x \end{array} $ $A = 4, B = 2$ and $C = -13$	B1 M1 A1	