3.1

1) $x^3 - 8x^2 + 16x - 5 = (x - 5)(x^2 - 3x + 1)$

2) $x^5 - x^4 - 4x^3 + 2x^2 + 3x - 1 = (x^2 + 2x - 1)(x^3 - 3x^2 + 3x - 7) + (20x - 8)$

3) $5x^4 + 3x^3 - 1 = (x^2 - 1)(5x^2 + 3x + 5) + (3x + 4)$

4) $6x^5 + 5x^4 - 25x^3 + 31x^2 - 12x + 5 = (2x^2 - 3x + 2)(3x^3 + 7x^2 - 5x + 1) + (x + 3)$

5) $3x^4 - 7x^3 - 18x^2 + 28x + 24 = (3x^2 + 8x + 4)(x^2 - 5x + 6)$

6) $-x^3 - x^2 + 5 = (2x - 3)\left(-\frac{1}{2}x^2 - \frac{5}{4}x - \frac{15}{8}\right) + \left(-\frac{5}{8}\right)$

7) $x^5 - 3x^2 + x + 5 = (-x^2 + x - 1)(-x^3 - x^2 + 4) + (-3x + 9)$

8) $-2x^3 - 3x + 1 = (3x^3 + x^2 - 1)\left(-\frac{2}{3}\right) + \left(\frac{2}{3}x^2 - 3x + \frac{1}{3}\right)$

9) $12x^4 + 47x^3 + 10x^2 + 12 = (-3x^2 - 8x + 6)(-4x^2 - 5x + 2) + (46x)$

10) $-4x^4 + 2x^3 - 7 = (-5)\left(\frac{4}{5}x^4 - \frac{2}{5}x^3 + \frac{7}{5}\right)$

11) $-4x^4 + 2x^3 - 7 = (-2x^3)(2x - 1) + (-7)$

12) $7x^2 - 3x + 2 = (2x^3 + 7x)0 + (7x^2 - 3x + 2)$

13) $42 = (3x^2 - 4x + 1)0 + (42)$

14) $4x^4 = (2x^2 - 5x + 1)\left(2x^2 + 5x + \frac{23}{2}\right) + \left(\frac{105}{2}x - \frac{23}{2}\right)$

15) $x^{12} - 1 = (x^6 - 1)(x^6 + 1)$

16) $x^{12} - 1 = (x^4 - 1)(x^8 + x^4 + 1)$

17) $x^{12} - 1 = (x^8 + x^4 + 1)(x^4 - 1)$

18) $x^5 - 32 = (x - 2)(x^4 + 2x^3 + 4x^2 + 8x + 16)$

19) $x^4 - a^4 = (x - a)(x^3 + ax^2 + a^2x + a^3)$

20) $x^5 + a^5 = (x + a)(x^4 - ax^3 + a^2x^2 - a^3x + a^4)$

21) $x^4 + a^4 = (x + a)(x^3 - ax^2 + a^2x - a^3) + (2a^4)$

22) $\frac{5}{8}x^2 - \frac{7}{12}x - \frac{1}{3} = \left(\frac{5}{4}x + \frac{1}{2}\right)\left(\frac{1}{2}x - \frac{2}{3}\right)$

23) $-\frac{1}{3}x^4 + 2x^2 - \frac{1}{2} = \left(\frac{3}{2}x^2 + \frac{1}{3}\right)\left(-\frac{2}{9}x^2 + \frac{112}{81}\right) + \left(-\frac{467}{486}\right)$

24) $\frac{2}{5}x^4 - \frac{3}{4}x^3 + \frac{1}{2}x^2 - \frac{2}{3}x = \left(-\frac{3}{5}x\right)\left(-\frac{2}{3}x^3 + \frac{5}{4}x^2 - \frac{5}{6}x + \frac{10}{9}\right)$