Topic assessment

1. (i) Add (x^3+2x^2-3x+1) to $(2x^3+5x-3)$ [2]
   (ii) Subtract $2x^3-3x^2+x-2$ from $(x^4+x^3-2x^2+1)$ [2]
   (iii) Multiply (x^3+4x^2-2x+3) by $(2x-1)$ [3]
   (iv) Multiply (x^2+2x+3) by (x^2-x+1) [3]
   (v) Divide $(2x^3-x^2+3x-4)$ by $(x-1)$ [3]

2. $(x-3)$ is a factor of the polynomial x^3+ax^2-5x+6.
   Find the value of a. [2]

3. (i) Solve the equation $2x^3-x^2-5x-2=0$. [4]
   (ii) Sketch the graph of $y=2x^3-x^2-5x-2$. [3]

4. (i) Show that $(x-3)$ is a factor of $6x^3-17x^2-5x+6$. [1]
   (ii) Hence solve the equation $6x^3-17x^2-5x+6=0$. [2]
   (iii) Sketch the graph of $y=6x^3-17x^2-5x+6$. [3]

5. $\mathrm{f}(x)=x^3+ax^2+bx+8$.
   (i) $(x-1)$ and $(x-2)$ are factors of $\mathrm{f}(x)$.
   Find the values of a and b. [4]
   (ii) Factorise $\mathrm{f}(x)$ completely and hence solve the equation $\mathrm{f}(x)=0$. [3]
   (ii) Sketch the graph of $y=\mathrm{f}(x)$. [3]

6. (i) Sketch the curve $y=(2x+1)(x-2)^2$.
   Draw the line $y=x+2$ on your graph and show that it intersects with the curve at the point $x=1$. [5]
   (ii) Show that the x-coordinates of the points where the line and the curve intersect satisfy the equation $2x^3-7x^2+3x+2=0$. [3]
   (iii) Find the x-coordinates of the other two points of intersection of the line and the curve, giving your answers to 2 decimal places. [4]

Total 50 marks