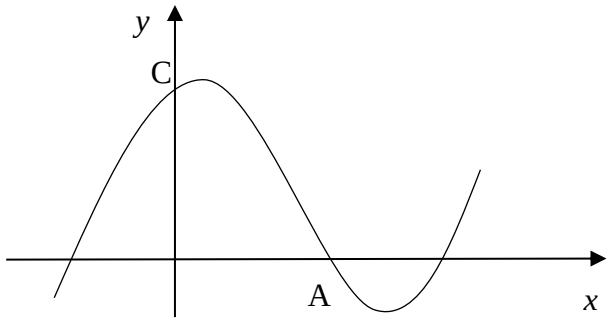
Higher Homework 6 – Polynomials

1. Determine the value of *a* given that $f(x) = x^3 + ax^2 + x + 3$ has a remainder of 5 when f(x) is divided by $(x + 1)$? [2]

2. Show that $(x - 3)$ is a factor of $f(x) = x^3 - 19x + 30$, Hence fully factorise f(x) [4]

3. The diagram shows a sketch of the graph of $y = x^3 - 4x^2 + x + 6$



   (a) Show that the graph cuts the *x*-axis at (3,0)
   (b) Hence find the coordinates of A and C [5]

4. Determine the range of values for *k* for which the equation $x^2 - 5x + k + 6 = 0$ has no real roots? [3]

5. State the equation of a quadratic graph that passes through the points (-2,0), (1,0) and (0,6) [2]

6. (a) (i) Show that $x = 1$ is a root of $x^3 + 8x^2 + 11x - 20 = 0$
   (ii) hence fully factorise $x^3 + 8x^2 + 11x - 20 = 0$ [4]

   (b) Solve $\log_2(x+3) + \log_2(x^2 + 5x - 4) = 3$ [5]