Higher_Factor Theorem.

1. $f(x) = x^3 - x^2 - 5x - 3$

(a) (i) Show that $(x + 1)$ is a factor of $f(x)$
(ii) Hence or otherwise factorise $f(x)$ fully *(5)*

(b) One of the turning points of the graph of $y = f(x)$ lies on the x – axis.
Write down the coordinates of this turning point. *(1)*

2. Factorise $2x^3 - 7x^2 + 4x + 4$ *(3)*

3. Find k if $(x - 2)$ is a factor of $x^3 + kx^2 - 4x - 12$ *(3)*

4. Express $x^4 - x$ in its fully factorised form *(3)*

5. When $f(x) = 2x^4 - x^3 + px^2 + qx + 12$ is divided by $(x - 2)$, the remainder is 114.
One factor of $f(x)$ is $(x + 1)$.
Find the values of p and q. *(5)*

TOTAL (20)