POLYNOMIALS. EXAM STANDARD

1. $2x + 1$ is a factor of $2x^3 – tx^2 + x + 2$. Find t.

2. If $x + 1$ and $x - 3$ are factors of $f(x) = 2x^3 - 5x^2 + px + q$, find p and q.

3. Given that $2x - 1$ is a factor of $4x^3 - 4x^2 + kx + 15$, find k.
   Factorize fully when k has this value.

4. Find the points where the curve $y = 4x^3 – 4x^2 - 29x + 15$ cuts the x-axis.

5. Factorize fully a) $2x^3 - 3x^2 - 11x + 6$ b) $3x^3 - 2x^2 - 19x – 6$

6. $x^3 + kx^2 - 13x - 10$ is divisible by $x + 2$. Find the value of k.

7. $2x^3 - 9x^2 + ax + 30$ is divisible by $2x - 3$. Find a.

8. $x + 3$ is a factor of $3x^3 + 2x^2 + nx + 6$. Find n then factorize fully.

9. $x^4 - 2x^3 + kx^2 + 3x - 2$ has $x + 2$ as a factor. Find the value of k.

10. Factorize fully $x^3+ 6x^2+ 9x + 4$ and hence solve $x^3+ 6x^2+ 9x + 4 = 0$.
Find the stationary points on the curve $y = x^3+ 6x^2+ 9x + 4$ and determine their nature.
Sketch the curve.

11. If $x - 1$ and $x + 3$ are both factors of $2x^3+ ax^2 + bx + 3$, find the values of a and b.

12. Find k if $x + 1$ is a factor of $x^3 + kx^2 - 5x - 6$. Find the other factors when k has this value.

13. Solve the equation $x^3- x^2 + x - 6 = 0$. Hence find the equation of the tangent to the curve $y = x^3- x^2 + x - 6$ at the points where it cuts the x-axis. Find the equation of the tangent at the point where the curve crosses the y-axis. Show that the two tangents meet at (3 /2, -9/2).

14. If $f(x) = 3x^4 + 8x^3 – 6x^2$, solve the equation $f'(x) = 24$.