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POLYNOMIALS

ASSIGNMENT NO. 4

1. Use factor theorem to show that $(x + 2)(x - 1)$ is a factor of the polynomial $p(x) = x^4 + x^3 + 2x^2 + 4x - 8$.
2. Factorise $x^2 + 3\sqrt{3}x + 6$ by middle term splitting.
3. If x and y be two positive real numbers such that $x > 3y$, $x^2 + 9y^2 = 369$ and $xy = 60$, find the value of $x - 3y$.
4. If $x = a + b$, $y = b + c$, $z = c + a$, prove that:
 $(x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx) = 2(a^3 + b^3 + c^3 - 3abc)$
5. Simplify: $(5a + 3b)^3 - (5a - 3b)^3$
6. If $x + \frac{1}{x} = 7$, then find the value of $x^3 + \frac{1}{x^3}$
7. Show that $y - 1$ is a factor of $y^{20} - 1$ and $y^{21} - 1$
8. Factorise: $7\sqrt{2}x^2 - 10x - 4\sqrt{2}$
9. Factorise: $a^9 - b^9$
10. Find the value of p and q if the polynomial $x^4 - px^3 + 2x^2 - 3x + q$ is divisible by $(x - 1)(x + 2)$
11. Find the value of $x^3 + y^3 - 12xy + 64$ when $x + y = -4$
12. Factorise: $(a^2 - 2a)^2 - 23(a^2 - 2a) + 120$
13. For what value of the polynomial $2x^3 + ax^2 + 11x + a + 3$ is exactly divisible by $2x - 1$.