Work Sheet – 02 (Mathematics, Chapter – Three, Exercise- 3.3, Algebraic Expression) for class – Ten (23.09.2020)

Creative Questions:

1. $y = 5 + 2\sqrt{6}$ and $x^2 + \dfrac{1}{x^2} = \dfrac{82}{9}$. [D.B.- 19]
   a) Resolve into factors: $m^3 - 3m^2 + 3m - 2$.
   b) Find the value of $y^4 - \dfrac{1}{y^4}$.
   c) Prove that, $27\left(x^3 - \dfrac{1}{x^3}\right) = 728$.

2. If $(p^2 + q^2)^2 = \sqrt[3]{125}$, $(p^2 - q^2)^2 = \sqrt[3]{64}$ and $x^2 = 9 + 4\sqrt{5}$. [B.B.- 19]
   a) Resolve into factors: $x^2 - 2\left(a + \dfrac{1}{a}\right)x + 4$.
   b) Prove that, $16(p^4 + q^4)p^2q^2 = 18$.
   c) Find the value of $x^5 + \dfrac{1}{x^5}$.

3. i) $a + b = p$, $a^2 + b^2 = q$, $a^3 + b^3 = r^3$, $m + n = \sqrt{7}$ and $m - n = \sqrt{5}$.
   ii) $x = \sqrt{5 + 2\sqrt{6}}$.
   a) Resolve into factors of $2y^2z^2 + 2z^2x^2 + 2x^2y^2 - x^4 - y^4 - z^4$.
   b) Find the value of $8mn(m^2 + n^2)$ and prove that, $p^3 + 2r^3 = 3pq$.
   c) Prove that, $\dfrac{x^6 - 1}{x^3} - \sqrt{2}\dfrac{(x^4 + 1)}{x^2} = 12\sqrt{2}$ using stem (ii).

4. $f(x) = \dfrac{2x + 1}{2x - 1}$, $g(x) = \dfrac{1 + x^2 + x^4}{x^2}$ and $P = a^2 + \dfrac{1}{a^2} - 2 - 2a + \dfrac{2}{a}$.
   a) Resolve P into factors.
   b) Find the value of $\dfrac{f\left(\frac{1}{x^2}\right) + 1}{f\left(\frac{1}{x^2}\right) - 1}$.
   c) Show that, $g\left(\dfrac{1}{x^2}\right) = g(x^2)$.

5. $2b^2c^2 + 2c^2a^2 + 2a^2b^2 - a^4 - b^4 - c^4$ and $c^2 + b^2 - a^2 + 2bc$ are two algebraic expressions.
   a) Resolve the second expression into factors.
   b) Express the first and the second expressions as the difference of two squares.
   c) Show that the common factor of the given two expressions is $(a + b + c)$.