SARALA BIRLA PUBLIC SCHOOL

Birla Knowledge City, Mahilong, Ranchi

CLASS IX (2020-21)

Sub: MATHS

Assignment-4

Chapter 2 : Polynomials

Remainder Theorem : Let P(x) be any polynomial of degree greater than or equal to one and let a be any real number . If P(x) is divided by the linear polynomial x-a then the remainder is P(a).

Dividend = (divisor X quotient) + remainder

Factor theorem : If P(x) is a polynomial of degree $n \geq 1$ and a is any real number then (i) x-a is a factor of P(x) , if P(a) = 0 , and (ii) P(a) = 0 , if x – a is a factor of P(x).

Algebraic Identities :

1. $(X + Y)^2 = X^2 + 2XY + Y^2$
2. $(X - Y)^2 = X^2 - 2XY + Y^2$
3. $X^2 - Y^2 = (X + Y)(X - Y)$
4. $(X+A)(X+B) = X^2 + (A + B)X + AB$
5. $(X+Y+Z)^2 = X^2 + Y^2 + Z^2 + 2XY + 2YZ + 2ZX$
6. $(X + Y)^3 = X^3 + 3X^2Y + 3XY^2 + Y^3$
7. $(X - Y)^3 = X^3 - 3X^2Y + 3Y^2X - Y^3$
8. $X^3 + Y^3 = (X + Y)^3 - 3XY(X + Y)$
9. $X^3 - Y^3 = (X - Y)^3 + 3XY(X - Y)$
10. $X^3 + Y^3 + Z^3 - 3XYZ = (X + Y + Z)(X^2 + Y^2 + Z^2 - XY - YZ - ZX)$

(Do as directed)

1. Find the remainder when $x^3 - ax^2 + 6x - a$ is divided by x-a .

2. Is (x + 1) is a factor of the polynomial $x^4 + 3x^3 + 3x^2 + x + 1$?

3. Use factor theorem to determine whether g(x) is a factor of p(x), where g(x) = x + 2 and p(x) = $x^3 + 3x^2 +3x +1$.

4. Find the value of K , if (x - 1) is a factor of p(x) = $Kx^2 - 3x + K$.

5. Factorise : (a) $2x^2 + 7x + 3$

(b) $x^3 - 3x^2 - 9x - 5$

6. Use suitable identity to evaluate : (a) (x + 8)(x - 10)

(b) 95 X 96

(c) $(998)^3$

7. Factorise the following using appropriate identities :

(a) $9x^2 + 6xy + y^{2.}$.

(b) $4x^2 + 9y^2 + 16 z^2 + 12 xy - 24 yz - 16 xz$.

(c) $27 - 125 a^3 - 135a + 225 a^2$.

8. Expand the following :

(a) $(2x - y + z)^2$

(b) $(\frac{3}{2} x + 1)^3$

9. Verify : (a) $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$

(b) $x^3 - y^3 = (x - y) (x^2 + xy + y^2)$

10. Factorise : (a) $8x^3 + y^3 + 27 z^3 - 18xyz$

(b) $27 y^3 + 125 z^3$
