

MATHEMATICS WORKSHEET- *POLYNOMIALS*

- If $p(x)$ divided by $(x - a)$, then the remainder is $p(a)$.
- * If $p(x)$ divided by $(x + a)$, then the remainder is $p(-a)$.
- If $(x - a)$ is a factor of $p(x)$, then $p(a) = 0$.
- * If $(x + a)$ is a factor of $p(x)$, then $p(-a) = 0$
- If $p(a) = 0$, then $(x-a)$ is a factor.
- * if $p(-a) = 0$, then $(x + a)$ is a factor.
- If $(x - a)$ is a factor of $p(x)$, then $p(a) = 0$.
- * If $(x + a)$ is a factor of $p(x)$, then $p(-a) = 0$.
- If $(ax - b)$ is a factor of $p(x)$, then $p(b/a) = 0$.
- * If $(ax + b)$ is a factor of $p(x)$, then $p(-b/a) = 0$.
- $(x + y)^2 = x^2 + 2xy + y^2$.
- $(x - y)^2 = x^2 - 2xy + y^2$.
- $(x^2 - y^2) = (x + y)(x - y)$
- $(x + a)(x + b) = x^2 + (a + b)x + ab$.
- $(x + y + z)^2 = x^2 + y^2 + z^2 + 2xy + 2xz + 2yz$.
- $(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$.
- $(x - y)^3 = x^3 - 3x^2y + 3xy^2 - y^3$.
- $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$.
- $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$.
- $x^3 + y^3 + z^3 - 3xyz = (x + y + z)(x^2 + y^2 + z^2 - xy - yz - xz)$
- If $x + y + z = 0$, then $x^3 + y^3 + z^3 = 3xyz$.

1. Find the remainder when $p(x) = 4x^3 - 12x^2 + 14x - 3$ when divided by $x - \frac{1}{2}$.
2. Find the remainder when $p(x) = x^3 - 6x^2 + 2x - 4$ is divided by $1 - 2x$.
3. If the polynomials $ax^3 + 3x^2 - 13$ and $2x^3 - 5x + a$ when divided by $(x-2)$ leave the same remainder. Find a .
4. Find the values of a and b so that the polynomial $x^3 - ax^2 - 13x + b$ has $(x-1)$ and $(x+3)$ as factors.

5. Find the remainder when $x^{51}+51$ is divided by $(x+1)$.
6. Find $p(0)$, $p(1)$ and $p(2)$ for each of the following polynomials.
 - 1). $p(x)=4x^2+x-5$
 - 2). $p(y)=9y^3+2y^2+y+7$
 - 3). $p(z)=(z+1)(z-1)$
 - 4). $p(t)=t^4+t+1$.
7. Divide the polynomial $x^3 - 27x^2 + 8x + 18$ by $(x-1)$ by long division method. Check remainder by remainder theorem.
8. Factorise the following quadratic polynomials by splitting the middle term.
 - 1). $u^2-30u+216$
 - 2). $7x^2+8x-12$
 - 3). $3x^2-10x+8$
 - 4). $2x^2+3x+1$.
9. Factorize: $(2x-3y)^3 + (3y-4z)^3 + (4z-2x)^3$.
10. Factorize: $a^3 - b^3 + 1 + 3ab$.
11. Factorize: $8(x+y)^3 - 27(x-y)^3$.
12. Find the value of $60^3-45^3-15^3$.
13. Factorize the expression: $49x^2+81y^2+144z^2+126xy+216yz+168xz$.
14. Evaluate the following with suitable identity:
 - 1). 105^3
 - 2). $.999^3$
 - 3). $(9.8)^3$
 - 4). 1001^3 .