

**CBSE Class 9 Mathematics**  
**NCERT Solutions**  
**CHAPTER 2**  
**Polynomials(Ex. 2.1)**

**1. Which of the following expressions are polynomials in one variable and which are not? State reasons for your answer.**

**(i)**  $4x^2 - 3x + 7$

**(ii)**  $y^2 + \sqrt{2}$

**(iii)**  $3\sqrt{t} + t\sqrt{2}$

**(iv)**  $y + \frac{2}{y}$

**(v)**  $x^{10} + y^3 + t^{50}$

**Ans. (i)**  $4x^2 - 3x + 7$

We can observe that in the polynomial  $4x^2 - 3x + 7$ , we have  $x$  as the only variable and the powers of  $x$  in each term are a whole number.

Therefore, we conclude that  $4x^2 - 3x + 7$  is a polynomial in one variable.

**(ii)**  $y^2 + \sqrt{2}$

We can observe that in the polynomial  $y^2 + \sqrt{2}$ , we have  $y$  as the only variable and the powers of  $y$  in each term are a whole number.

Therefore, we conclude that  $y^2 + \sqrt{2}$  is a polynomial in one variable.

**(iii)**  $3\sqrt{t} + t\sqrt{2}$

We can observe that in the polynomial  $3\sqrt{t} + t\sqrt{2}$ , we have  $t$  as the only variable and the powers of  $t$  in each term are not a whole number.

Therefore, we conclude that  $3\sqrt{t} + t\sqrt{2}$  is not a polynomial in one variable.

(iv)  $y + \frac{2}{y}$

We can observe that in the polynomial  $y + \frac{2}{y}$ , we have  $y$  as the only variable and the powers of  $y$  in each term are not a whole number.

Therefore, we conclude that  $y + \frac{2}{y}$  is not a polynomial in one variable.

(v)  $x^{10} + y^3 + t^{50}$

We can observe that in the polynomial  $x^{10} + y^3 + t^{50}$ , we have  $x, y$  and  $t$  as the variables and the powers of  $x, y$  and  $t$  in each term is a whole number.

Therefore, we conclude that  $x^{10} + y^3 + t^{50}$  is a polynomial but not a polynomial in one variable.

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**2. Write the coefficients of  $x^2$  in each of the following:**

(i)  $2 + x^2 + x$

(ii)  $2 - x^2 + x^3$

(iii)  $\frac{\pi}{2}x^2 + x$

(iv)  $\sqrt{2}x - 1$

**Ans. (i)**  $2 + x^2 + x$

The coefficient of  $x^2$  in the polynomial  $2 + x^2 + x$  is 1.

**(ii)**  $2 - x^2 + x^3$

The coefficient of  $x^2$  in the polynomial  $2 - x^2 + x^3$  is  $-1$ .

**(iii)**  $\frac{\pi}{2}x^2 + x$

The coefficient of  $x^2$  in the polynomial  $\frac{\pi}{2}x^2 + x$  is  $\frac{\pi}{2}$ .

(iv)  $\sqrt{2}x - 1$

The coefficient of  $x^2$  in the polynomial  $\sqrt{2}x - 1$  is 0.

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**3. Give one example each of a binomial of degree 35, and of a monomial of degree 100.**

**Ans.** The binomial of degree 35 can be  $x^{35} + 9$ .

The binomial of degree 100 can be  $t^{100}$ .

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**4. Write the degree of each of the following polynomials:**

(i)  $p(x) = 5x^3 + 4x^2 + 7x$

(ii)  $p(y) = 4 - y^2$

(iii)  $f(t) = 5t - \sqrt{7}$

(iv) 3

**Ans. (i)**  $5x^3 + 4x^2 + 7x$

We know that the degree of a polynomial is the highest power of the variable in the polynomial.

We can observe that in the polynomial  $5x^3 + 4x^2 + 7x$ , the highest power of the variable  $x$  is 3.

Therefore, we conclude that the degree of the polynomial  $5x^3 + 4x^2 + 7x$  is 3.

**(ii)**  $4 - y^2$

We know that the degree of a polynomial is the highest power of the variable in the polynomial.

We can observe that in the polynomial  $4 - y^2$ , the highest power of the variable  $y$  is 2.

Therefore, we conclude that the degree of the polynomial  $4 - y^2$  is 2.

**(iii)**  $5t - \sqrt{7}$

We know that the degree of a polynomial is the highest power of the variable in the polynomial.

We observe that in the polynomial  $5t - \sqrt{7}$ , the highest power of the variable  $t$  is 1.

Therefore, we conclude that the degree of the polynomial  $5t - \sqrt{7}$  is 1.

**(iv) 3**

We know that the degree of a polynomial is the highest power of the variable in the polynomial.

We can observe that in the polynomial 3, the highest power of the assumed variable  $x$  is 0.

Therefore, we conclude that the degree of the polynomial 3 is 0.

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### 5. Classify the following as linear, quadratic and cubic polynomials:

**(i)**  $x^2 + x$

**(ii)**  $x - x^3$

**(iii)**  $y + y^2 + 4$

**(iv)**  $1 + x$

**(v)**  $3t$

**(vi)**  $r^2$

**(vii)**  $7x^3$

**Ans. (i)**  $x^2 + x$

We can observe that the degree of the polynomial  $x^2 + x$  is 2.

Therefore, we can conclude that the polynomial  $x^2 + x$  is a quadratic polynomial.

**(ii)**  $x - x^3$

We can observe that the degree of the polynomial  $x - x^3$  is 3.

Therefore, we can conclude that the polynomial  $x - x^3$  is a cubic polynomial.

**(iii)**  $y + y^2 + 4$

We can observe that the degree of the polynomial  $y + y^2 + 4$  is 2.

Therefore, the polynomial  $y + y^2 + 4$  is a quadratic polynomial.

**(iv)**  $1 + x$

We can observe that the degree of the polynomial  $(1 + x)$  is 1.

Therefore, we can conclude that the polynomial  $1 + x$  is a linear polynomial.

**(v)**  $3t$

We can observe that the degree of the polynomial  $(3t)$  is 1.

Therefore, we can conclude that the polynomial  $3t$  is a linear polynomial.

**(vi)**  $r^2$

We can observe that the degree of the polynomial  $r^2$  is 2.

Therefore, we can conclude that the polynomial  $r^2$  is a quadratic polynomial.

**(vii)**  $7x^3$

We can observe that the degree of the polynomial  $7x^3$  is 3.

Therefore, we can conclude that the polynomial  $7x^3$  is a cubic polynomial.