

Exercise-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.

$$y + \frac{2}{y}$$

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.

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

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

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

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

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

$$\text{Ans. (i)} 2 + x^2 + x$$

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 $\frac{\pi}{2}$.

$$\sqrt{2}x-1$$

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

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} .

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.

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.