POLYNOMIALS - CHAPTER 2

EXERCISE 2A

Answer 1:

(i) $x^5 - 2x^3 + x + \sqrt{3}$ is an expression having only non-negative integral powers of *x.* So, it is a polynomial. Also, the highest power of *x* is 5, so, it is a polynomial of degree 5.

(ii) $y^3 + \sqrt{3}y$ is an expression having only non-negative integral powers of *y.* So, it is a polynomial. Also, the highest power of *y* is 3, so, it is a polynomial of degree 3.

(iii) $t^2 - \frac{2}{5}t + \sqrt{5}$ is an expression having only non-negative integral powers of *t.* So, it is a polynomial. Also, the highest power of *t* is 2, so, it is a polynomial of degree 2.

(iv) $x^{100} - 1$ is an expression having only non-negative integral power of *x.* So, it is a polynomial. Also, the highest power of *x* is 100, so, it is a polynomial of degree 100.

(v) $\frac{1}{\sqrt{2}}x^2 - \sqrt{2}x + 2$ is an expression having only non-negative integral powers of *x.* So, it is a polynomial. Also, the highest power of *x* is 2, so, it is a polynomial of degree 2.

(vi) $x^{-2} + 2x^{-1} + 3$ is an expression having negative integral powers of *x.* So, it is not a polynomial.

(vii) Clearly, 1 is a constant polynomial of degree 0.

(viii) Clearly, $-\frac{3}{5}$ is a constant polynomial of degree 0.

(ix) $\frac{x^2}{2} - 2x^2 = \frac{x^2}{2} - 2x^{-2}$

This is an expression having negative integral power of *x* i.e. -2. So, it is not a polynomial.

(x) $\sqrt[3]{2}x^2 - 8$ is an expression having only non-negative integral power of *x.* So, it is a polynomial. Also, the highest power of *x* is 2, so, it is a polynomial of degree 2.

(xi) $\frac{1}{2x^2} = \frac{1}{2}x^{-2}$ is an expression having negative integral power of *x.* So, it is not a polynomial.

(xii) $\frac{1}{\sqrt{5}}x^{\frac{1}{2}} + 1$

In this expression, the power of *x* is $\frac{1}{2}$ which is a fraction. Since it is an expression having fractional power of *x,* so, it is not a polynomial.

(xiii) $\frac{3}{5}x^2 - \frac{7}{3}x + 9$ is an expression having only non-negative integral powers of *x.* So, it is a polynomial. Also, the highest power of *x* is 2, so, it is a polynomial of degree 2.

(xiv) $x^4 - x^{\frac{3}{2}} + x - 3$

In this expression, one of the powers of x is $\frac{3}{2}$ which is a fraction. Since it is an expression having fractional power of x, so, it is not a polynomial.

(xv) $2x^3 + 3x^2 + \sqrt{x} - 1 = 2x^3 + 3x^2 + x^{\frac{1}{2}} - 1$
In this expression, one of the powers of x is $\frac{1}{2}$ which is a fraction. Since it is an expression having fractional power of x, so, it is not a polynomial.

Answer 2:

(i) $-7 + x$ is a polynomial with degree 1.
it is a linear polynomial.

(ii) $6y$ is a polynomial with degree 1.
it is a linear polynomial.

(iii) $-z^3$ is a polynomial with degree 3.
it is a cubic polynomial.

(iv) $1 - y - y^3$ is a polynomial with degree 3.
it is a cubic polynomial.

(v) $x - x^3 + x^4$ is a polynomial with degree 4.
it is a quartic polynomial.

(vi) $1 + x + x^2$ is a polynomial with degree 2.
it is a quadratic polynomial.

(vii) $-6x^2$ is a polynomial with degree 2.
it is a quadratic polynomial.

(viii) -13 is a polynomial with degree 0.
it is a constant polynomial.

(ix) $-p$ is a polynomial with degree 1.
it is a linear polynomial.

ANSWER 3. i) In $x + 3x^2 - 5x^3 + x^4$ the coefficient of x^3 is -5.

ii) In $\sqrt{3} - 2\sqrt{2}x + 6x^2$ the coefficient of x is $-2\sqrt{2}$.

iii) $2x - 3 + x^3$ can be written as $x^3 + 0x^2 + 2x - 3$.
In $x^3 + 0x^2 + 2x - 3$ the coefficient of x^2 is 0.

iv) In $\frac{3}{8}x^2 - \frac{2}{7}x + \frac{1}{6}$ the coefficient of x is $-\frac{2}{7}$.

v) In $\frac{\pi}{2}x^2 + 7x - \frac{2}{5}\pi$ the constant term is $-\frac{2}{5}\pi$.

ANSWER 4. i) $\frac{4x-5x^2+6x^3}{2x}$

We can write it separately as

$= \frac{4x}{2x} - \frac{5x^2}{2x} + \frac{6x^3}{2x}$

On further simplification we get

$= 2 - \frac{5}{2}x + 3x^2$

The degree of given expression is 2.

ii) $y^2 (y - y^3)$

By multiplying the terms

We get

$= y^3 - y^5$

The degree of the given expression is 5.

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

By multiplying the terms

We get

$6x^4+9x^3 - 4x^3 - 6x^2$

On further simplification

$= 6x^4 +5x^3 - 6x^2$

The degree of the given expression is 4.

iv) $-\frac{1}{2}x + 3$

The degree of the given expression is 1.

v) -8

The given expression is a constant polynomial of degree is zero .

vi) $x^{-2}(x^4+ x^2)$

By taking common terms out

$= x^{-2}.x^2(x^2 + 1)$

On further simplification

$=x^{-2+2}(x^2+1)$

So we get

$= x^0(x^2+1)$
$= x^2+1$

The degree of the expression is 2.

ANSWER 5. i) Example of a monomial of degree 5 is $4x^5$.

ii) Example of a binomial of degree 8 is $x - 4x^8$.

iii) Example of a trinomial of degree 4 is $1+ 3x + x^4$.

iv) Example of a monomial of degree 0 is 1.

ANSWER 6. i) $x - 2x^2 + 8 + 5x^3$ in standard form is written as $5x^3 - 2x^2 + x + 8$.

ii) $\frac{2}{3} + 4y^2 - 3y + 2y^3$ in standard form is written as $2y^3 + 4y^2 - 3y + \frac{2}{3}$.

iii) $6x^3 + 2x - x^5 - 3x^2$ in standard form is written as $- x^5 + 6x^3 - 3x^2 + 2x$.

iv) $2 + t - 3t^3 + t^4 - t^2$ in standard form is written as $t^4 - 3t^3 - t^2 + t + 2$.

EXERCISE-2B