PUBLIC SCHOOL DARBHANGA
SESSION (2020-21)
CLASS-IX
MATHEMATICS
POLYNOMIALS (Answer key)
WORKSHEET NO.1

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

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

The equation $4x^2 - 3x + 7$ can be written as $4x^2 - 3x^1 + 7x^0$

Since *x* is the only variable in the given equation and the powers of x (i.e., 2, 1 and 0) are whole numbers, we can say that the expression $4x^2 - 3x + 7$ is a polynomial in one variable.

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

Solution:

The equation $y^2 + \sqrt{2}$ can be written as $y^2 + \sqrt{2}y^0$

Since *y* is the only variable in the given equation and the powers of y (i.e., 2 and 0) are whole numbers, we can say that the expression $y^2 + \sqrt{2}$ is a polynomial in one variable.

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

Solution:

The equation $3\sqrt{t} + t\sqrt{2}$ can be written as $3t^{\frac{1}{2}} + \sqrt{2}t$

Though, *t* is the only variable in the given equation, the powers of *t* (i.e., $\frac{1}{2}$) is not a whole number.

Hence, we can say that the expression $3\sqrt{t} + t\sqrt{2}$ is **not** a polynomial in one variable.

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

Solution:

The equation $y + \frac{2}{y}$ can be written as $y+2y^{-1}$

Though, *y* is the only variable in the given equation, the powers of *y* (i.e.,-1) is not a whole number.

Hence, we can say that the expression $y + \frac{2}{y}$ is **not** a polynomial in one variable.

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

Solution:

Here, in the equation $x^{10} + y^3 + t^{50}$

Though, the powers, 10, 3, 50, are whole numbers, there are 3 variables used in the expression $x^{10} + y^3 + t^{50}$. Hence, it is **not** a polynomial in one variable.

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

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

The equation $2 + x^2 + x$ can be written as $2 + (1)\, x^2 + x$

We know that, coefficient is the number which multiplies the variable.

Here, the number that multiplies the variable x^2 is 1

∴, the coefficients of x^2 in $2 + x^2 + x$ is 1.

(ii) $2 – x^2 + x^3$

Solution:

The equation $2 – x^2 + x^3$ can be written as $2 + (–1) x^2 + x^3$

We know that, coefficient is the number (along with its sign,i.e., - or +) which multiplies the variable.

Here, the number that multiplies the variable x^2 is -1 ∴

, the coefficients of x^2 in $2 – x^2 + x^3$ is -1.

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

Solution:

The equation $\frac{\pi}{2}x^2 + x$ can be written as $(\frac{\pi}{2}) x^2 + x$

We know that, coefficient is the number (along with its sign,i.e., - or +) which multiplies the variable.

Here, the number that multiplies the variable x^2 is $\frac{\pi}{2}$ ∴

, the coefficients of x^2 in $\frac{\pi}{2}x^2 + x$ is $\frac{\pi}{2}$.

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

Solution:

The equation $\sqrt{2}x-1$ can be written as $0x^2 + \sqrt{2}x-1$ [Since $0x^2$ is 0]

We know that, coefficient is the number (along with its sign,i.e., - or +) which multiplies the variable.

Here, the number that multiplies the variable x^2 is 0 ∴

, the coefficients of x^2 in $\sqrt{2}x-1$ is 0.

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

Binomial of degree 35: A polynomial having two terms and the highest degree 35 is called a binomial of degree 35 Eg., $3x^{35}+5$

Monomial of degree 100: A polynomial having one term and the highest degree 100 is called a monomial of degree 100 Eg., $4x^{100}$

4. Write the degree of each of the following polynomials: (i) $5x^3 + 4x^2 + 7x$

Solution:

The highest power of the variable in a polynomial is the degree of the polynomial.

Here, $5x^3 + 4x^2 + 7x = 5x^3 + 4x^2 + 7x^1$

The powers of the variable x are: 3, 2, 1

∴, the degree of $5x^3 + 4x^2 + 7x$ is 3 as 3 is the highest power of x in the equation.

(ii) $4 – y^2$

Solution:

The highest power of the variable in a polynomial is the degree of the polynomial.

Here, in $4 – y^2$,

The power of the variable y is: 2

∴, the degree of $4 - y^2$ is 2 as 2 is the highest power of y in the equation.

(iii)5t – $\sqrt{7}$

Solution:

The highest power of the variable in a polynomial is the degree of the polynomial.

Here, in 5t – $\sqrt{7}$,

The power of the variable y is: 1

∴, the degree of 5t – $\sqrt{7}$ is 1 as 1 is the highest power of y in the equation.

(iv)3

Solution:

The highest power of the variable in a polynomial is the degree of the polynomial.

Here, $3 = 3 \times 1 = 3x^0$

The power of the variable here is: 0 ∴

, the degree of 3 is 0.

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

Solution:

We know that,

Linear polynomial: A polynomial of degree one is called a linear polynomial.

Quadratic polynomial: A polynomial of degree two is called a quadratic polynomial. Cubic polynomial: A polynomial of degree three a cubic polynomial.

(i) $x^2 + x$

Solution:

The highest power of $x^2 + x$ is 2

∴, the degree is 2

Hence, $x^2 + x$ is a quadratic polynomial

(ii) x – x^3

Solution:

The highest power of $x - x^3$ is 3

∴, the degree is 3

Hence, $x - x^3$ is a cubic polynomial

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

Solution:

The highest power of $y + y^2 + 4$ is 2 ∴

, the degree is 2

Hence, $y + y^2 + 4$ is a quadratic polynomial

(iv) 1 + x

Solution:

The highest power of 1 + x is 1

$\therefore$, the degree is 1

Hence, 1 + x is a linear polynomial

(v) 3t

Solution:

The highest power of 3t is 1

$\therefore$, the degree is 1

Hence, 3t is a linear polynomial

(vi) r^2

Solution:

The highest power of r^2 is 2

$\therefore$, the degree is 2

Hence, r^2 is a quadratic polynomial

(vii) $7x^3$

Solution:

The highest power of $7x^3$ is 3

$\therefore$, the degree is 3

Hence, $7x^3$ is a cubic polynomial