Exerise 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*) $x^{10} + y^3 + t^{50}$.

Sol. (*i*) $4x^2 - 3x + 7$ is a polynomial in variable x, as exponents of the variable in different terms are whole numbers.

(*ii*) $y^2 + \sqrt{2}$ is a polynomial in variable y, as exponent of variable y is a whole number.

(*iii*) $3\sqrt{t} + t\sqrt{2} = 3t^{1/2} + \sqrt{2}\,t$ is not a polynomial, as exponent of variable t in first term, *i.e.*, $3\,t^{1/2}$ is not a whole number.

(*iv*) $y + \frac{2}{y} = y + 2y^{-1}$ is not a polynomial, as exponent of the variable y in the term $2y^{-1}$ is not a whole number.

(*v*) $x^{10} + y^3 + t^{50}$ is a polynomial in three variables.

2. *Write the coefficient 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*) $\sqrt{2}\,x - 1$.

Sol. (*i*) Coefficient of x^2 in $2 + x^2 + x$ is 1.

(*ii*) Coefficient of x^2 in $2 - x^2 + x^3$ is -1.

(*iii*) Coefficient of x^2 in $\frac{\pi}{2}x^2 + x$ is $\frac{\pi}{2}$.

(*iv*) Coefficient 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.*

Sol. (*i*) Binomial of degree 35 is $2x^{35} + x$.

(*ii*) Monomial of degree 100 is $-7x^{100}$.

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

(*i*) $5x^3 + 4x^2 + 7x$ (*ii*) $4 - y^2$

(*iii*) $5t - \sqrt{7}$ (*iv*) 3.

Sol. (*i*) Degree of polynomial $5x^3 + 4x^2 + 7x$ is 3.

(*ii*) Degree of polynomial $4 - y^2$ is 2.

(*iii*) Degree of polynomial $5t - \sqrt{7}$ is 1.

(*iv*) Degree of 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*) $7x^3$.

Sol. (*i*) Polynomial $x^2 + x$ is a quadratic polynomial.

(*ii*) Polynomial $x - x^3$ is a cubic polynomial.

(*iii*) Polynomial $y + y^2 + 4$ is a quadratic polynomial.

(*iv*) Polynomial $1 + x$ is a linear polynomial.

(*v*) Polynomial $3t$ is a linear polynomial.

(*vi*) Polynomial r^2 is a quadratic polynomial.

(*vii*) Polynomial $7x^3$ is a cubic polynomial.