

Q1. Which of the following expressions are polynomials in one variable and which are not?

State the reasons for your answers

1. $3x^2 - 4x + 15$
2. $y^2 + 2\sqrt{3}$
3. $3\sqrt{x} + \sqrt{2}x$
4. $x - \frac{4}{x}$
5. $x^{12} + y^2 + t^{50}$

Sol :

1. $3x^2 - 4x + 15$ – it is a polynomial of x
2. $y^2 + 2\sqrt{3}$ – it is a polynomial of y
3. $3\sqrt{x} + \sqrt{2}x$ – it is not a polynomial since the exponent of $3\sqrt{x}$ is not a positive term
4. $x - \frac{4}{x}$ – it is not a polynomial since the exponent of $-\frac{4}{x}$ is not a positive term
5. $x^{12} + y^2 + t^{50}$ – it is a three variable polynomial which variables of x, y, t

Q2. Write the coefficients of x^2 in each of the following

1. $17 - 2x + 7x^2$
2. $9 - 12x + x^2$
3. $\frac{\pi}{6}x^2 - 3x + 4$
4. $\sqrt{3}x - 7$

Sol :

Given , to find the coefficients of x^2

1. $17 - 2x + 7x^2$ – the coefficient is 7
2. $9 - 12x + x^2$ – the coefficient is 1
3. $\frac{\pi}{6}x^2 - 3x + 4$ – the coefficient is $\frac{\pi}{6}$
4. $\sqrt{3}x - 7$ – the coefficient is 0

Q3. Write the degrees of each of the following polynomials :

1. $7x^3 + 4x^2 - 3x + 12$
2. $12 - x + 2x^2$
3. $5y - \sqrt{2}$
4. $7 - 7x^0$
5. 0

Sol :

Given , to find degrees of the polynomials

Degree is highest power in the polynomial

1. $7x^3 + 4x^2 - 3x + 12$ – the degree is 3
2. $12 - x + 2x^2$ – the degree is 2
3. $5y - \sqrt{2}$ – the degree is 1
4. $7 - 7x^0$ – the degree is 0

5. 0 – the degree of 0 is not defined

Q4. Classify the following polynomials as linear, quadratic, cubic and biquadratic polynomials :

1. $x + x^2 + 4$
2. $3x - 2$
3. $2x + x^2$
4. $3y$
5. $t^2 + 1$

f. $7t^4 + 4t^2 + 3t - 2$

Sol :

Given

1. $x + x^2 + 4$ – it is a quadratic polynomial as its degree is 2
2. $3x - 2$ – it is a linear polynomial as its degree is 1
3. $2x + x^2$ – it is a quadratic polynomial as its degree is 2
4. $3y$ – it is a linear polynomial as its degree is 1
5. $t^2 + 1$ – it is a quadratic polynomial as its degree is 2

f. $7t^4 + 4t^2 + 3t - 2$ – it is a bi-quadratic polynomial as its degree is 4

Q5. Classify the following polynomials as polynomials in one variable, two – variables etc :

1. $x^2 - xy + 7y^2$
2. $x^2 - 2tx + 7t^2 - x + t$
3. $t^3 - 3t^2 + 4t - 5$
4. $xy + yz + zx$

Sol :

Given

1. $x^2 - xy + 7y^2$ – it is a polynomial in two variables x and y
2. $x^2 - 2tx + 7t^2 - x + t$ – it is a polynomial in two variables x and t
3. $t^3 - 3t^2 + 4t - 5$ – it is a polynomial in one variable t
4. $xy + yz + zx$ – it is a polynomial in 3 variables in x , y and z

Q6. Identify the polynomials in the following :

1. $f(x) = 4x^3 - x^2 - 3x + 7$
2. b. $g(x) = 2x^3 - 3x^2 + \sqrt{x} - 1$
3. $p(x) = \frac{2}{3}x^2 + \frac{7}{4}x + 9$
4. $q(x) = 2x^2 - 3x + \frac{4}{x} + 2$
5. $h(x) = x^4 - x^{\frac{3}{2}} + x - 1$
6. $f(x) = 2 + \frac{3}{x} + 4x$

Sol :

Given

1. $f(x) = 4x^3 - x^2 - 3x + 7$ – it is a polynomial

2. $g(x) = 2x^3 - 3x^2 + \sqrt{x} - 1$ – it is not a polynomial since the exponent of $\sqrt{x}$ is a negative integer
3. $p(x) = \frac{2}{3}x^2 + \frac{7}{4}x + 9$ – it is a polynomial as it has positive integers as exponents
4. $q(x) = 2x^2 - 3x + \frac{4}{x} + 2$ – it is not a polynomial since the exponent of $\frac{4}{x}$ is a negative integer
5. $h(x) = x^4 - x^{\frac{3}{2}} + x - 1$ – it is not a polynomial since the exponent of $-x^{\frac{3}{2}}$ is a negative integer
6. $f(x) = 2 + \frac{3}{x} + 4x$ – it is not a polynomial since the exponent of $\frac{3}{x}$ is a negative integer

Q7. Identify constant , linear , quadratic abd cubic polynomial from the following polynomials :

1. $f(x) = 0$
2. $g(x) = 2x^3 - 7x + 4$
3. $h(x) = -3x + \frac{1}{2}$
4. $p(x) = 2x^2 - x + 4$
5. $q(x) = 4x + 3$
6. $r(x) = 3x^3 + 4x^2 + 5x - 7$

Sol :

Given ,

1. $f(x) = 0$ – as 0 is constant , it is a constant variable
2. $g(x) = 2x^3 - 7x + 4$ – since the degree is 3 , it is a cubic polynomial
3. $h(x) = -3x + \frac{1}{2}$ – since the degree is 1 , it is a linear polynomial
4. $p(x) = 2x^2 - x + 4$ – since the degree is 2 , it is a quadratic polynomial
5. $q(x) = 4x + 3$ – since the degree is 1 , it is a linear polynomial
6. $r(x) = 3x^3 + 4x^2 + 5x - 7$ – since the degree is 3 , it is a cubic polynomial

Q8. Give one example each of a binomial of degree 25, and of a monomial of degree 100

Sol :

Given , to write the examples for binomial and monomial with the given degrees

Example of a binomial with degree 25 – $7x^{25} - 5$

Example of a monomial with degree 100 – $2t^{100}$