

Polynomials

1. What are polynomials?
2. Write down the degree of each of the following polynomials:

(i) $7 - 3x$

(v) $6u^4 - u^3v^2 + uv^3 + v^4$

(vi) $x^5 - 6xy^5 + 4x^4y + y^5$

Add the following polynomials:

3. $3x - 5 + 6x^2 + x^3 - x^4$ and $6 - 5x - 2x^3 + 2x^2 + 2x^4$

4. $5x^4 - 6x^3 + 2x - 4x^2 + 6$, $2x^2 + 3x^3 - 4x^4 - 3x - 6$ and $3x^3 + x + x^2 - 2$.

Subtract:

5. $1 + x + x^2 - x^3$ from $2x^2 - 3x^3 + 4x - 7$

6. What must be added to $x^2 + 5x - 6$ to get $x^3 - x^2 + 3x - 2$?

7. What must be subtracted from $x^3 - 3x^2 + 5x - 1$ to get $2x^3 + x^2 - 4x + 2$?

Find the product of

8. $x^3 + 2x^2 - 5x + 1$ and $3x - 8$

9. $8x^4 - 3x^2 + 9x - 8$ and $2x^2 - 5x + 3$

10. Divide:

(iii) $-72x^2y^2z$ by $-12xyz$

11. Divide:

(iii) $4x^3 + 8x^2 - x$ by $-\frac{1}{2}x$

12. $(4x^3 - 37x^2 + 52x - 15)$ by $(4x - 5)$

13. $71x - 31x^2 - 24x^3 - 21$ by $(3 - 8x)$

14. $x^4 - 2x^3 + 2x^2 + x + 4$ by $x^2 + x + 1$

15. $6x^5 - 28x^3 + 3x^2 - 30x - 9$ by $2x^2 - 6$

16. Find the quotient and the remainder when

(ii) $2x^4 - x^3 + 10x^2 + 8x - 5$ divided by $(x^2 - x + 6)$.

$t^6 + 3t^2 + 10$ is divided by $t^3 + 1$

17. What must be subtracted from $8x^4 + 14x^3 - 2x^2 + 7x - 8$ so that the resulting polynomial is exactly divisible by $4x^2 + 3x - 2$.

18. Find the values of a and b so that $x^4 + x^3 + 8x^2 + ax + b$ is divisible by $(x^2 + 1)$.

Answers

1. An algebraic expression in which the variables involved have only non-negative integral powers is called a polynomial.
2. (i) 1 (v) 5 (vi) 6
3. $x^4 - x^3 + 8x^2 - 2x + 1$
4. $x^4 - x^2 - 2$
5. $-2x^3 + x^2 + 3x - 8$
6. $x^3 - 2x^2 - 2x + 4$
7. $-x^3 - 4x^2 + 9x - 3$
8. $3x^4 - 2x^3 - 31x^2 + 43x - 8$
9. $16x^6 - 40x^5 + 18x^4 + 33x^3 - 70x^2 + 67x - 24$
10. (iii) $6xy$
11. (iii) $-8x^2 - 10x + 2$
12. $(x^2 - 8x + 3)$
13. $(3x^2 + 5x - 7)$
14. $x^2 - 3x + 4$
15. $3x^2 - 5x + \frac{3}{2}$
16. (ii) quotient = $2x^2 + x - 1$, remainder = $x + 1$
(iv) quotient = $t^3 - 1$, remainder = $3t^2 + 11$
17. $14x - 10$
18. $a = 1, b = 7$