

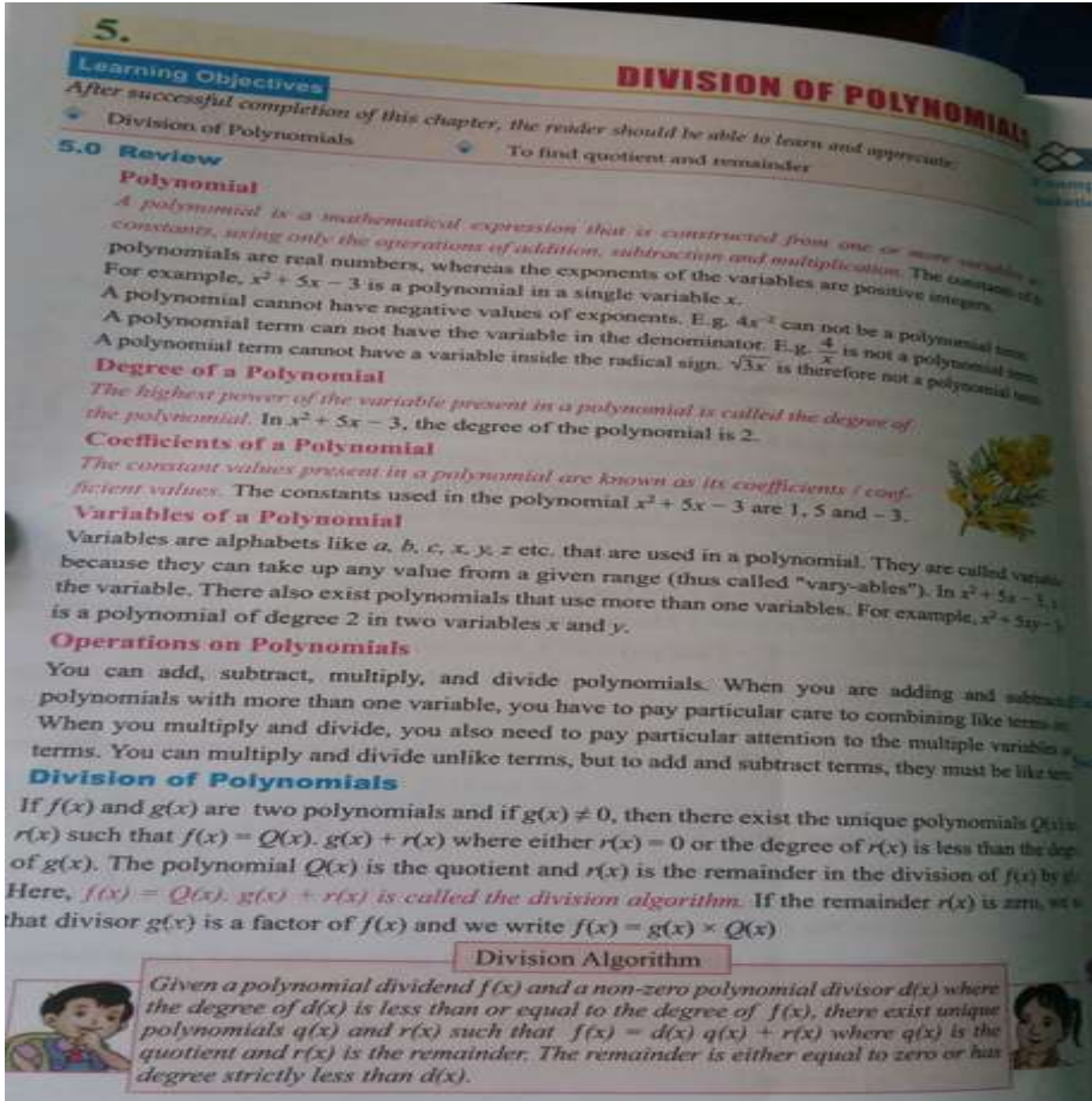
Class: Ten

Subject- Opt. Mathematics

Source: Photo of exercises are given below.

Work: Read & write all the definitions

Do your work neatly



Example 3 If the quotient, $q(x) = 2x + 3$, remainder, $r(x) = 4 - x$ and divisor $d(x) = x^2 + 1$, find the polynomial $f(x)$.

Solution Here, $q(x) = 2x + 3$, $r(x) = 4 - x$ and $d(x) = x^2 + 1$
 We know that, $f(x) = q(x) \times d(x) + r(x)$
 or, $f(x) = (2x + 3) \times (x^2 + 1) + 4 - x$
 or, $f(x) = (2x^3 + 2x + 3x^2 + 3) + 4 - x$
 $\therefore f(x) = 2x^3 + 3x^2 + x + 7$
 Thus, the required polynomial is $f(x) = 2x^3 + 3x^2 + x + 7$.

EXERCISE 5

LET'S GET READY

- Define the following terms with an example.
 - Polynomial
 - Degree of polynomial
- If the degree of $f(x)$ is ' $4m$ ' and degree of $g(x)$ is ' m ' what is the degree of $f(x) \div g(x)$?
 - If the degree of $f(x)$ is ' m ' and degree of $g(x)$ is ' n ', $m > n$ then what is the degree of $f(x) \div g(x)$?
 - If $f(x)$ and $g(x)$ be the two polynomials, under what condition $f(x) \div g(x)$ will be an integer?
- If $f(x) = x^3 - 2x^2 + 7$ and $g(x) = x^2 - 3$ then what is the degree of quotient in $f(x) \div g(x)$?
 - If $p(x) = x^3 - 8$ and $q(x) = x - 2$ then what is the degree of quotient when $p(x) \div q(x)$?
- If the quotient, $q(x)$, remainder, $r(x)$, and divisor $d(x)$ then write the polynomial $f(x)$ in terms of $q(x)$, $r(x)$ and $d(x)$.
 - State the division algorithm of polynomial.
 - In $f(x) = q(x) \times d(x) + r(x)$, write the meaning of each term.

SOLVE

- If $2x^3 - 7x^2 + x + 10 = (x - 1)Q(x) + R$, find the remainder R and polynomial $Q(x)$.
 - If $x^3 - 19x - 30 = (x + 2) \cdot Q(x)$, find $Q(x)$ by using long division method.
 - If $x^3 - 21x - 20 = (x + 1) \cdot Q(x)$, find $Q(x)$ by using long division method.
- If $x^4 - 5x^3 + 2x - 5 = (x - 5) \cdot Q(x) + R$, find $Q(x)$ and R .
 - If $2x^3 - 11x^2 + 19x - 10 = (x - 5) \cdot Q(x) + R$, find $Q(x)$ and R .
 - If $x^3 + x^2 - x + 1 = D(x) \cdot (x^2 + 2x + 1) + 2$ then find $D(x)$.
- A polynomial $f(x)$ is divided by $(x - a)$ to get remainder a^2 & quotient $(5x - 2)$. Find $f(x)$.
 - A polynomial $p(x)$ is divided by $(4x + 3)$ to get the quotient $(2x^2 - 3x + 1)$ and remainder 4. Find $p(x)$.
 - A polynomial $f(x)$ is divided by a linear polynomial $4x + 2$ to get the quotient $2x^3 - 4x^2 + 8x$ & remainder 12. Find the polynomial $f(x)$.
- Divide the following polynomials $p(x)$ by $g(x)$.
 - $p(x) = 8x^3 + 2x^2 - 6x + 5$ and $g(x) = x - 2$
 - $p(x) = 3x^3 - 4ax^2 + 8a^2x - a^3$ and $g(x) = 3x + 2a$
 - $p(x) = 2x^3 - 6x^2a + 8xa^2 - 8a^3$ and $g(x) = x - 2a$
 - $p(x) = 4x^3 - 2x^2 + 6x + 1$ and $g(x) = 2x - 1$
- Find the quotient $Q(x)$ and the remainder $R(x)$ when $p(x)$ is divided by $g(x)$.
 - $p(x) = x^2 + 3x + 5$ and $g(x) = x + 1$
 - $p(x) = 2x^2 + 13x + 7$ and $g(x) = 2x + 1$
 - $p(x) = 12a^2 - 9ax - 6x^2$ and $g(x) = a - 2x$

- (a) The volume of a rectangular solid is given by the polynomial $3x^3 - 3x^2 - 33x + 54$. The length of the solid is given by $3x$ and the width is given by $(x - 2)$. Find the height of the solid.
- (b) The volume of a shipping crate is $h^3 + 5h^2 + 6h$. If the height is h and the length is $h + 2$, then what is the width?

7. Divide:

- (a) $(x^5 - 1)$ by $(x - 1)$ (b) $(x^6 - 1)$ by $(x - 1)$ (c) $(x^7 - 1)$ by $(x - 1)$

6.

SYNTHETIC DIVISION

Learning Objectives

After successful completion of this chapter, the reader should be able to learn and appreciate:

- Synthetic Division
- To find quotient and remainder using synthetic division

6.1 Synthetic Division

To speed up the division process, we could simply work with coefficients only. The method of synthetic division is the shortest way of dividing a polynomial $f(x)$ by a binomial $(x - a)$. To understand this, compare the two procedures exhibited below where the polynomial $f(x)$ is divided by the binomial $g(x)$.
 $f(x) = x^3 + 3x^2 - 5x + 2$ and $g(x) = x - 2$

Usual division	Synthetic division
$\begin{array}{r} x^2 + 5x + 5 \\ x - 2 \overline{) x^3 + 3x^2 - 5x + 2} \\ \underline{x^3 - 2x^2} \\ 5x^2 - 5x \\ \underline{5x^2 - 10x} \\ 5x + 2 \\ \underline{5x - 10} \\ 12 \end{array}$	
\therefore Quotient = $x^2 + 5x + 5$ and Remainder = 12	\therefore Quotient = $x^2 + 5x + 5$ and Remainder = 12

For the computational procedures of synthetic division, the working rule (indicated by the arrows) may be remembered in the following way:

Step 1	Compare $(x - 2)$ by $(x - a)$ then $a = 2$.
Step 2	Write down the leading coefficients (sign inclusive) of $f(x)$; here 1, 3, -5, 2 are the leading coefficients of x^3, x^2, x^1 and x^0 [$x^0 = 1$]
Step 3	Bring down the first coefficient 1.
Step 4	Multiply 1 by the value of $a = 2$.
Step 5	With the result under the next coefficient (here it is 3) and add.
Step 6	Multiply the result obtained (here it is 5) by 2 and write the result under the next coefficient -5 and add.
Step 7	Continue the process, the last term is the remainder, the number just before the last term will be the constant term the third number from the end will be the coefficient of x and so on of the quotient.



Subject- English

Unit -6

Poem, Exercise 1 and 2

Exercise- 2 i and ii

Subject-Social Studies

Write about Changu Narayan Temple.

Subject- Science

1. What happens in the reactivity in the group of noble gas from top to bottom and why?
2. Define representative and transition element. Why lanthanides and actinides are kept separately below the periodic table? Write two reasons.
3. What do you mean by metallic and non-metallic character of element? How do these characters vary in period and groups?
4. What do you mean by d-block elements? Why hydrogen is kept in group- IA of modern periodic table?

The End.