

**CHAPTER - 3 – ALGEBRA (Ex 3.1 – Ex 3.8)**

**I. Answer the Following (2 marks)**

1. Find the LCM of the given expressions.

(I)  $4x^2y, 8x^3y^2$

(II)  $9a^3b^2, 12a^2b^2c$

2. Find the LCM and GCD for the following and verify that  $f(x) \times g(x) = \text{LCM} \times \text{GCD}$   $21x^2y, 35xy^2$ .

3. Reduce each of the following rational expressions to its lowest form  $\frac{x^2-1}{x^2+x}$ .

4. Find the excluded values, if any of the following expressions  $\frac{y}{y^2-25}$ .

5. Multiply (I)  $\frac{x^2}{9y^2}$  by  $\frac{27y}{x^5}$

(II)  $\frac{x^4b^2}{x-1}$  by  $\frac{x^2-1}{a^4b^2}$

6. Simplify (I)  $\frac{4x^2y}{2z^2} \times \frac{6xz^3}{20y^4}$

(II)  $\frac{5t^3}{4t-8} \times \frac{6t-12}{10t}$

7. Simplify (I)  $\frac{x(x+1)}{x-2} + \frac{x(1-x)}{x-2}$

(II)  $\frac{x+2}{x+3} + \frac{x-1}{x-2}$

8. Find the square root of the following rational expressions

(I)  $\frac{400x^4y^{12}z^{16}}{100x^8y^4z^4}$

(II)  $\frac{121(a+b)^8(x+y)^8(b-c)^8}{81(b-c)^4(a-b)^{12}(b-c)^4}$

**II. Answer the Following (3 marks)**

1. In an interschool athletic meet, with total of 24 individual prizes, securing a total of 56 points, a first place secures 5 points, a second place secures 3 points, and a third place secures 1 point. Having as many third place finishers as first and second place finishers, find how many athletes finished in each place.

2. Find the LCM of the given expressions

(I)  $2x^2 - 5x - 3, 4x^2 - 36$

(II)  $(2x^2 - 3xy)^2, (4x - 6y)^3, 8x^3 - 27y^3$

3. Find the LCM of each pair of the following polynomials  $a^2 + 4a - 12, a^2 - 5a + 6$  whose GCD is a -2.

4. Reduce each of the following rational expressions to its lowest form.  $\frac{p^2-3p-40}{2p^2-24p^2+64p}$ .

5. Find the excluded values, if any of the following expressions  $\frac{x^2-27}{x^2+x^2-6x}$ .

6. Simplify  $\frac{x^3-y^3}{3x^2+9xy+6y^2} \times \frac{x^2+2xy+y^2}{x^2-y^2}$ .

7. If  $x = \frac{a^2+3a-4}{3a^2-3}$  and  $y = \frac{a^2+2a-8}{2a^2-2a-4}$  find the value of  $x^2 y^2$ .

8. Subtract  $\frac{1}{x^2+2}$  from  $\frac{2x^3+x^2+3}{(x^2+2)^2}$

9. Which rational expression should be subtracted from  $\frac{x^2+6x+8}{x^3+8}$  to get  $\frac{3}{x^2-2x+4}$

10. Find the square root of the following

(I)  $4x^2+20x+25$

(II)  $9x^2 - 24xy + 30xz - 40yz + 25z^2 + 16y^2$

**III. Answer the Following (5 marks)**

1. The sum of thrice the first number, second number and twice the third number is 5. If thrice the second number is subtracted from the sum of first number and thrice the third we get 2. If the third number is subtracted from the sum of twice the first, thrice the second, we get 1. Find the numbers.
2. Vani, her father and her grand father have an average age of 53. One-half of her grand father's age plus one-third of her father's age plus one fourth of Vani's age is 65. Four years ago if Vani's grandfather was four times as old as Vani then how old are they all now ?
3. The sum of the digits of a three-digit number is 11. If the digits are reversed, the new number is 46 more than five times the former number. If the hundreds digit plus twice the tens digit is equal to the units digit, then find the original three digit number?
4. There are 12 pieces of five, ten and twenty rupee currencies whose total value is ₹105. When first 2 sorts are interchanged in their numbers its value will be increased by ₹20. Find the number of currencies in each sort.
5. Find the GCD of the given polynomials  $3x^3 + 3x^2 + 3x + 3$ ,  $6x^3 + 12x^2 + 6x + 12$ .
6. Find the GCD of each pair of the following polynomials  $(x^3 + y^3)$ ,  $(x^4 + x^2y^2 + y^4)$  whose LCM is  $(x^3 + y^3)(x^2 + xy + y^2)$
7. Simplify (I)  $\frac{2a^2+5a+3}{2a^2+7a+6} \div \frac{a^2+6a+5}{-5a^2-35a-50}$  (II)  $\frac{12t^2-22t+8}{3t} \div \frac{3t^2+2t-8}{2t^2+4t}$
8. If  $A = \frac{2x+1}{2x-1}$ ,  $B = \frac{2x-1}{2x+1}$  find  $\frac{1}{A-B} - \frac{2B}{A^2-B^2}$
9. Pari needs 4 hours to complete a work. His friend Yuvan needs 6 hours to complete the same work. How long will it take to complete if they work together?
10. Iniya bought 50 kg of fruits consisting of apples and bananas. She paid twice as much per kg for the apple as she did for the banana. If Iniya bought ₹ 1800 worth of apples and ₹ 600 worth bananas, then how many kgs of each fruit did she buy?
11. Find the square root of the following  $(4x^2 - 9x + 2)$   $(7x^2 - 13x - 2)$   $(28x^2 - 3x - 1)$
12. Find the square root of the following polynomials by division method  
 (I)  $x^4 - 12x^3 + 42x^2 - 36x + 9$  (II)  $121x^4 - 198x^3 - 183x^2 + 216x + 144$
13. Find the values of a and b if the following polynomials are perfect squares  
 (I)  $4x^4 - 12x^3 + 37x^2 + bx + a$  (II)  $ax^4 + bx^3 + 361x^2 + 220x + 100$
14. Find the values of m and n if the following polynomials are perfect squares  
 (I)  $36x^4 - 60x^3 + 61x^2 - mx + n$  (II)  $x^4 - 8x^3 + mx^2 + nx + 16$