Exerise1

Q.1 Find the remainder when p(x) is divided by g(x), where

1. $P(x) = 2x^2 + 5x + 2$, $G(x) = 2x$. [2]
2. $P(x) = x^2 + x$, $g(x) = x$ [0]
3. $P(x) = 3x^3 + 9x$, $g(x) = 3x$ [0]
4. $P(x) = 5x^2 + 5$, $g(x) = 5x$ [5]
5. $P(x) = 7x^7 + 9$, $g(x) = 7x$ [9]

Exercise 2

Q.1 Write each of the following polynomials in the standard form.

1. $-x^2 + 1 + x$ [$- x^2 + x + 1$]
2. $x - 2x^2$ [$-2x^2 + x + 0$]
3. x^2 [$x^2 + 0x + 0$]
4. $1 + 2x + x^3 - x^2$ [$x^3 - x^2 + 2x + 1$]
5. $3x^2 + 1$ [$3x^2 + 0x + 1$]
6. $3x^2 + 5x$ [$3x^2 + 5x + 0$]
7. $7x$ [$7x + 0$]
8. $x^3 - 1$ [$x^3 + 0x2 + 0x - 1$]

Exercise - 3

1. Find the remainder when x^3+3x^2+3x+1 is divided by $x+5$. [-64]
2. Find the remainder when x^3+x^2+x+1 is divided by $x+1$ [0]
3. Find the remainder when x^2-10 is divided by $x+3$. [-1]
4. Find the quotient and remainder when $x^3-13x+12$ is divided by $x+4$. [Q= x2 -4x +3. R=0]
5. Find the quotient and remainder when $6x^2+13x-15$ is divided by $3x - 1$. [Q= 2x +5, R=0]

Exercise -4

1. Check whether $x + 1$ is a factor of $x^3 + 3x^2 + 3x + 1$ [Yes]
2. Check whether $x^2 + x - 1$ is a factor of $x^4 + 3x^3 + 2x^2 + x + 2$. [No]
3. Check whether x^2+2x+3 is a factor of x^3+3x^2+5x+3. [Yes]
4. Check whether $2x+1$ is a factor of $8x^3+1$. [Yes]
5. Find all the zeros of $x^3-6x^2+5x+12$, if one of its zeros is '-1'. [-1, 3, 4]
6. Find all the zeros of $x^4+ 2x^3-13x^2-38x-24$, if two of its zeros are '-1' and '-3'. [4, -3, -1, -2]
7. Find all the zeros of $6x^4+ 35x^3+62x^2+35x+6$, if two of its zeros are '-2' and '-3'. [-1/3, -1/2, -2, -3]

Exercise 5

1. On dividing $3x^4 + kx^3 + x^2 - x + 4$ by $x^2 - 3$ the quotient and remainder were $3x^2 + 2x + 10$ and $5x + 34$, respectively Find the value of k. [2]
2. On dividing $2x^3 + x^2 + 2x + 1$ by $x - 3$ the quotient and remainder were $2x^2 + 7x + 23$ and $14k$, respectively Find the value of k. [5]
3. On dividing $x^2 + kx + 9$ by $x - 1$ the quotient and remainder were $x + 6$ and 15, respectively Find the value of k. [5]

4. On dividing $3x^3 + 9x^2 + 7x + 15$ by some polynomial g(x) the quotient and remainder were 3x and 4x + 15, respectively Find the value of g(x). [$x^2 + 3x + 1$]
5. On dividing $4x^4 + 3x^3 + 2x^2 + x - 1$ by $x^2 + 2x + 7$ the quotient comes out to be $4x^2 - 5x - 16$. Find the remainder. [68x + 111]
6. On dividing $x^3 + 5x + 2$ by $x^2 + 2x + 2$ the remainder comes out to be 7x + 6. Find the quotient. [x -2]

Exercise-6

1. Find the zeroes of the cubic polynomials:

(a) $P(x) = x^3 - 2x^2 - 15x + 36$ [3, 3, -4]

(b) $P(x) = 4x^3 + 32x^2 + 69x + 45$ [-3/2, -3/2, -5]

And then verify the relationship between the zeroes and coefficients.

2. Find a cubic polynomial with the sum of its zeroes, sum of the products of its zeroes taken two at a time, and the product of is zeroes as 2, -7, -14 respectively. [$x^3 - 2x^2 - 7x + 14$]

Worksheet I

1. Write a quadratic polynomial, the sum and p[product of whose zeroes are 3 and -2. [$x^2 - 3x - 2$]
2. Write must be subtracted from $8x^4+14x^3-2x^2+7x-8$, so that he resulting polynomial is exactly divisible by $4x^2+3x-2$? [14x – 10]
3. If α and β are the zeroes of the quadratic polynomials $2x^2 + 3x + 5$, find the value of $\frac{1}{\alpha} + \frac{1}{\beta}$. [-3/5]
4. If 2/3 and -3 are the zeroes of the polynomial $ax^2 + 7x + b$, find the values of a and b. [a =3, b= -6]
5. Find the quadratic polynomial, sum of whose zeroes are 8 and whose product is 12. Find the zeroes of the polynomial. [6 and 2]
6. If one zero of the polynomials $(a^2+9)\,x^2+13x+6a$ is reciprocal of the other, find the value of a. [3]
7. If the product of the polynomials $ax^2 - 6x - 6$ is 4, find the value of a. [-3/2]
8. Give an example of polynomials f(x), g(x) and r(x) satisfying f(x)=g(x) q(x) +r(x) where deg r(x)+0
9. If a and b are zeroes of the quadratic polynomial $f(x) = kx^2 + 4x + 4$, such that $a^2+b^2=24$, find the values of k. [k=-1 or 2/3]
10. If (x + a) is a factor of $2x^2+2ax+5x+10$, find a [2]
11. Find all the zeroes of the polynomial $x^4+x^3-34x^2-4x+120$, if two of its zeroes are 2 and -2. [-6 and 5]
12. Find all the zeroes of the polynomial $2x^4+7x^3-19x^2-14x+30$, if two of its zeroes are $\sqrt{2}$ and $\sqrt{2}$. [√2, -√2, -5, 3/2]
13. The sum and product of the zeroes of a quadratic polynomial are -1/2 and -3 respectively. What is the quadratic polynomial? [$2x^2 + x - 6$]

ABHYAS Academy, Behind Pragat Shiv Mandir, Near Govt. College, Nishat Cinema Road, Ambala Cantt.
Ph No. +91-171-2631595, 9416541198, e-Mail: anusethi1968@yahoo.com Website: www. abhyasonline.in

14. Find the zeroes of $x^2 - 3$ and verify the relationship between the zeroes and its coefficients. [+- √3]
15. Check whether the polynomials $x^2 - 4x + 3$ is a factor of the polynomial $x^3 - 3x^2 - x+3$. [Yes, Q= x +1]
16. What must be added to $6x^5+5x^4+11x^3+3x^2+x+1$, so that the polynomial so obtained is exactly divisible by $3x^3-2x+4$? [17x -13]
17. Check whether the polynomial $x^2-10x+16$ are a factor of the polynomial $5x^3-70x^2+153x-342$ by applying the division algorithm. [5x -20]
18. On dividing p(x) by $x^2 +2x +2$, the quotient and the remainder are x^2+1 and 18 respectively. Find p(x). [$x^4 + 2x^3 + 3x^2 + 2x +20$]
19. What must be subtracted from $2x^4-11x^3+29x^2-40x+29$, so that the resulting polynomial is exactly divisible by x^2-bx+4? [-2x +5]

Worksheet II

1. Find whether 2, ½ and -1 are zeroes of a cubic polynomial $p(x) =2x^3-3x^2-3x+2$. If yes, verify the relationship between zeroes and the coefficients.
2. If two zeroes of polynomial $2x^3-x^2-7x+6$ are 3/2 and 1, find the 3rd zero by using relationship between zeroes and coefficients.
3. Divide x^3-4x^2+6x-3 by x-1
4. Verify the division algorithm on dividing $x^4-3x^3+2x^2+2x+1$ by x^2-x+2.
5. If one of the zeroes of a cubic polynomial $p(x) =x^3-3x^2-x+3$ is 1, find other two zeroes.
6. If two zeroes of the polynomial $p(x) = 2x^4+3x^3-19x^2=6x+8$ are 1 and 2 respectively, find al zeroes of p(x) and verify division algorithm.
7. Divide polynomial p(x) by polynomial g(x), and find the quotient and remainder in each of the following.
   (a) $P(x) =2x^3-9x^2+13x-6$ $q(x) =2x-3$
   (b) $P(x) =4x^4+x^2+7x+2$ $q(x) = x^2-1$.
8. Divide $2x^4+5x^3+2x^2+3x+2$ by x^2+1 and verify the division algorithm.
9. Which of the following has remainders equal to 0, when p(x) is divided by g(x)?
   (a) $P(x) = 14x^3-45x^2+21x+10$
   (b) $P(x) =2x^3-9x^2+7x+6$ $g(x) =x-2$
10. Is $14x^3-45x^2+21x+10$ a multiple of 2x-5?
11. If (x-2) is a factor of $x^4+5x^3+2x^2-kx+2$, find the value of K.
12. When a polynomial x^3+4x^2+7x-1 is divided by (x-1), find the quotient.
13. The sum and product of zeroes of the polynomial p(x) are given to be -9 and 14. Find the quadratic polynomial. Also verify the relationship between zeroes and coefficients after finding the polynomial
14. Find whether 3, -1 and -1/3 are zeroes of the cubic polynomial $p(x) =3x^3-5x^2-11x-3$. If yes, verify the relationship between zeroes and the coefficients.
15. On dividing the polynomials x^3+3x^2+4x-8 by a polynomial g(x), the quotient and the remainder are $x^2+5x+14$ and 20 respectively, find g(x).

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Ph No. +91-171-2631595, 9416541198, e-Mail: anusethi1968@yahoo.com Website: www. abhyasonline.in