Class: X   MATHEMATICS –WORKSHEET

CHAPTERS 1- 5

1. Find the HCF and LCM of 26 and 91 and verify that
   LCM x HCF = Product of the integers.
2. Find the HCF of 65 and 117 and find a pair of integral values of m and n
   such that HCF = 65 m+ 117 n. (m =2, n = -1).
3. During a sale, colour pencils were being sold in packs of 24 each and
   crayons in packs of 32 each. If you want full packs of both and the same
   number of pencils and crayons, how many of each would you need to
   buy? (4 packets of colour pencils, 3 packets of crayons)
4. A mason has to fit a bathroom with square marble tiles of the largest
   possible size. The size of the bathroom is 10 ft by 8 ft. What would be the
   size in inches of the tile required that has to be cut and how many such
   tiles are required. (24 inches, 20 tiles)
5. Three bells toll at intervals of 12 minutes, 15 minutes and 18 minutes
   respectively. If they start tolling together, after what time will they next
   toll together? (Ans:180 mins)
6. Two tankers contain 850 litres and 680 litres of petrol respectively. Find
   the maximum capacity of a container which can measure the petrol of
   either taker in exact number of times.(Ans:170 litres)
7. An army contingent of a1000 members is to march behind an army band
   of 56 members in a parade. The two groups are to march in the same
   number of columns. What is the maximum number of columns in which
   they can march? (Ans:8)
8. A circular field has a circumference of 360 km. Three cyclists start
   together and can cycle 48, 60 and 72 km a day, round the field. When will
   they meet again?
9. If HCF of 144 and 180 is expressed in the form $13m - 3$,find the value of
   m .
10. Determine the values of p and q so that the prime factorization of 2520
    is expressible as $2^3 \times 3^P \times q \times 7$
11. (i) Check whether 6^n can end with the digit 0 for any natural number n.
    (ii) Show that 12^n cannot end with digits 0 or 5 for any natural number 'n'.
    (iii) Show that 9^n cannot end with digit 0 for any natural number n .
12. (i) Explain why 7 x 11 x 13 + 13 is a composite number
    (ii) Explain why 7 x 6 x 5 x 4 x 3 x 2 x 1 + 5 is a composite number

(iii) Explain whether the number 3 x 5 x 13 x 46 + 23 is a prime number or a composite number.

13. Prove that $\sqrt{2}+\sqrt{5}$ is irrational.

14. Show that the square of any positive integer is of the form $3m\ or\ 3m+1$ for some integer m.

15. Use Euclid's lemma to division show that the cube of any positive integer is either of the form $9m, 9m+1, 9m+8$ for some integer m

16. Show that the cube of any positive integer is of the form 4m,4m + 1or 4m+ 3 for some integer m.

17. Find the largest number that will divide 2053 and 967 and leaves a remainder of 5 and 7 respectively. (ans: 64)

18. Find the zeros of the following polynomials and verify the relationship
   (i) $6x^2-x-2$ (ii) $8y^2-16y$ (iii) $4\sqrt{3}x^2+5x-2\sqrt{3}$ (iv) $6x^2-3-7x$

19. Find the zeros of the following polynomials and verify the relationship
   (i) $\sqrt{3}x^2+10x+7\sqrt{3}$ (ii) $x^2+2\sqrt{2}x-6$ (iii) $v^2+4\sqrt{3}v-15$ (iv) $9x^2-5$

20. If $\alpha\ and\ \beta$ are zeroes of a polynomial x^2-x-2, find the values of
   $$\alpha+\beta\ \&\ \frac{1}{\alpha}+\frac{1}{\beta}$$
   (1, -1/2)

21. Quadratic polynomial $2x^2-3x+1$ has zeroes as $\alpha\ and\ \beta$. Now from a quadratic polynomial whose zeroes are $3\alpha\ and\ 3\beta$.

22. On dividing $x^3-8x^2+20x-10$ by a polynomial $g(x)$, the quotient and the remainder were $x-4$ and 6 respectively. Find $g(x)$.

23. Obtain all other zeroes of the polynomial $x^4+4x^3-2x^2-20x-15$ if two of its zeroes are $\sqrt{5}$ and $-\sqrt{5}$

24. If two zeros of the polynomial $f(x)=x^4-6x^3-26x^2+138x-35$ are $2\pm\sqrt{3}$,then find other zeros.

25. Find 'c' if the system of equations $cx+3y+(3-c)=0, 12x+cy=c$ has infinitely many solutions? (Ans c = 6)

26. Find the value of 'k' for which the equations have infinitely many solutions.2x+3y = 7, (k+1)x +(2k-1)y = 4k +1. (k = 5)

27. In a two digit number, the digit in the unit place is twice of the digit in the tenth place. If the digits are reversed, the new number is 27 more than the given number. Find the number. (36)

28. Solve: 6(ax +by) = 3a + 2b, 6(bx − ay) = 3b − 2a (Ans:1/2, 1/3).

29. For what values of m and n the following system of linear equations has infinitely many solutions. $3x + 4y = 12$, $(m+n)x + 2(m-n)y = 5m - 1$ (m = 5, n = 1)

30. The ratio of incomes of two persons is 9:7 and the ratio o their expenditures is 4:3. If each of them saves Rs.200 per month, find their monthly incomes (1800m, 1400)

31. Find the four angles of a cyclic quadrilateral ABCD in which $\angle A = (2x-1)^0, \angle B = (y+5)^0, \angle C = (2y+15)^0, \angle D = (4x-7)^0$ (65, 55, 115, 125)

32. 8 men and 12 boys can finish a piece of work in 10 days, while 6 men and 8 boys can finish it in 14 days. Find the time taken by one men and that by one boy alone to finish the work. (140days, 280).

33. A man travels 370 km partly by train and partly by car. If he covers 250 km by train and the rest by car, it takes him 4 hours. But if he travels 130 km by train and the rest by car, he takes 18 minutes longer. Find the speed of the train and the that of the car. ((100km/hr, 80km/hr).

34. The boat covers 30 km upstream and 44 km downstream in 10 hours. In 13 hours, it can go 40 km upstream and 55 km downstream. Determine the speed of the stream and that of the boat in still water. (3km/hr, 8km/hr)

35. The sum of two digit number and the number obtained by reversing the order of its digits is 165. If the digits differ by 3, find the number. (69 or 96).

36. If twice the son's age in years is added to the father's age, the sum is 70. But if twice the father's age is added to the son's age, the sum is 95. Find the ages of father and son. (40, 15).

37. Points A and B are 90 km apart from each other on a highway. A car starts from A and another B at the same time. If they go in the same direction they meet in 9 hours and if they go in opposite directions they meet in 9/7 hours. Find their speeds. (40, 30).

38. Solve: $\dfrac{10}{x+y} + \dfrac{2}{x-y} = 4,$ $\dfrac{15}{x+y} - \dfrac{5}{x-y} = -2.$

39. Solve the pair of linear equations: $\dfrac{2}{x} + \dfrac{3}{y} = 13,$ $\dfrac{5}{x} - \dfrac{4}{y} = -2.$

40. A part of monthly hostel charge is fixed and the remaining depends on the number of days one has taken food in the mess. When Swetha takes food for 20 days, she has to pay Rs.3000 as hostel charges, whereas Neha takes food for 25 days and pays Rs.3500 as hostel charges. Find the fixed charges and the cost of food per day. (y = 100 , x = 1000).

41. For what value of 'k' the roots of the equation $x^2 + 4x + k = 0$ are real. $(k \le 4)$.

42. Find the value of k for which the roots of the equation $3x^2 - 10x + k = 0$ are reciprocal of each other. (k = 3).

43. Write all the values of p for which the quadratic equation $x^2 + px + 16 = 0$ has equal roots. Find the roots of the equation so obtained.   (4, 4)

44. Two water taps can fill a tank in $1\frac{7}{8}$ hours. The tap with longer diameter takes 2 hours less than the tap with smaller one to fill the tank separately. Find the time in which each tap can fill the tank separately. (3 hrs and 5 hrs.)

45. A boat goes 30 km upstream and 44 km downstream in 10 hours. In 13 hours, it can go 40 km upstream and 55 km downstream. Determine the speed of the stream and that the boat in still water. (8, 3).

46. Solve: $\dfrac{1}{2a+b+2x} = \dfrac{1}{2a} + \dfrac{1}{b} + \dfrac{1}{2x}$ (x= -b/2, x = -a).

47. If x = 3 is one root of the quadratic equation $x^2 - 2kx - 6 = 0$, then find the value of 'k'. (k=1/3).

48. Solve: $\sqrt{3}x^2 - 2x - 8\sqrt{3} = 0$ $(\dfrac{-4}{\sqrt{3}}, 2\sqrt{3})$

49. Find the 9th term from the end (towards the first term) of the A.P 5, 9, 13,...185.

50. For what value of k will k+9, 2k – 1 and 2k + 7 are the consecutive terms of an A.P?

51. For what value of k will the consecutive terms 2k +1, 3k + 3 and 5k -1 form an A.P?

52. How many terms of the A.P 18, 16, 14, ... be taken so that their sum is zero?

53. If the ratio of sum of the first m and n terms of an A.P is $m^2 : n^2$, show that the ratio of its mth and nth terms is (2m -1): (2n -1).

54. Which term of the sequence $20, 19\frac{1}{4}, 18\frac{1}{2},...$ is the first negative term?

  (28).

55. Which term of the arithmetic sequence 5, 15,25,... will be 130 more than its 31st term?   (44).