



## Octahedral classes, kharadi

2nd floor, yashwant plaza, near bank of India,

### Class 10 - Mathematics

#### Maths 1-4 Practice set

Maximum Marks: 130

Time Allowed: 3 hours

#### Section A

1. 1 marks Real no.

- Express the given number as the product of its prime factors: 5005.
- Find the HCF of 2825 and 70625.
- Show that there is no value of  $n$  for which  $(2^n \times 5^n)$  ends in 5.
- Find the ratio between the LCM and HCF of 5, 15 and 20.
- Find the value of  $p$  for which the polynomial  $x^3 + 4x^2 - px + 8$  is exactly divisible by  $(x - 2)$ .
- If  $p$  and  $q$  are two prime numbers, then what is their HCF?
- What is the product of the H.C.F. and L.C.M. of the smallest prime number and the smallest composite number?
- Show that the square of an odd integer is of the form  $4q + 1$  for the some integer  $q$ .
- Can we have any  $n \in \mathbb{N}$ , where  $4^n$  ends digit zero?
- If  $A = 2n + 13$  and  $B = n + 7$ , where  $n$  is a natural number then find HCF of  $A$  and  $B$ .

2. 1 mark polynomial

- Write the polynomial, the product and sum of whose zeroes are  $-\frac{9}{2}$  and  $-\frac{3}{2}$  respectively.
- If the sum of the zeros of the quadratic polynomial  $f(t) = kt^2 + 2t + 3k$  is equal to their product, find the value of  $k$ .
- If  $\alpha, \beta$  are zeroes of  $x^2 + 5x + 5$ , find the value of  $\alpha^{-1} + \beta^{-1}$ .
- A polynomial of degree five is divided by a quadratic polynomial. If it leaves a remainder, then find the degree of remainder.
- $p(x) = g(x)q(x) + r(x)$ . If degree of  $g(x) = 4$ , degree of  $q(x) = 3$  and degree of  $r(x) = 2$ , then find the degree of  $p(x)$ .
- Find the value of ' $k$ ' such that the quadratic polynomial  $x^2 - (k + 6)x + 2(2k + 1)$  has sum of the zeros is half of their product.
- If  $\alpha$  and  $\beta$  are the zeroes of the quadratic polynomial  $f(x) = x^2 - px + q$ , then find the value of  $\alpha^2 + \beta^2$ .
- Find a quadratic polynomial whose one zero is -5 and product of zeroes is 0.
- $p(x) = ax^2 + bx + c$ . If  $a + b + c = 0$ , then find one of its zero.
- Find a quadratic polynomial whose one zero is -8 and sum of zeroes is 0.

3. 1 mark linear

- Solve for  $x$  and  $y$ :  $\frac{2x+5y}{xy} = 6$ ;  $\frac{4x-5y}{xy} = -3$ .
- If  $12x + 17y = 53$  and  $17x + 12y = 63$  then find the value of  $(x + y)$ .
- How many solutions do the pair of linear equations  $3x + 2y = 5$  and  $2x - 3y = 7$  have?
- Find the value of  $k$  for which the pair of linear equations  $4x + 6y - 1 = 0$  and  $2x + ky - 7 = 0$  represents parallel lines.
- The larger of two supplementary angles exceeds the smaller by 20 degrees. Find the angles.
- Find the value of  $k$  so that the following system of equation has infinite solutions:  
 $3x - y - 5 = 0$ ,  $6x - 2y + k = 0$
- For what value of  $a$  the following pair of linear equation has infinitely many solutions?  
 $2x + ay = 8$   
 $ax + 8y = a$

- h) Find whether the lines representing the following pair of linear equations intersect at a point, are parallel or coincident:  
 $2x - 3y + 6 = 0$ ;  $4x - 5y + 2 = 0$
- i) Find whether the pair of linear equations  $y = 0$  and  $y = -5$  has no solution, unique solution or infinitely many solutions
- j) If  $x = a$ ,  $y = b$  is the solution of the pair of equations  $x - y = 2$  and  $x + y = 4$ , find the values of  $a$  and  $b$ .

4. 1 mark Quadratic

- a) Show that the equation  $2(a^2 + b^2)x^2 + 2(a + b)x + 1 = 0$  has no real roots, when  $a \neq b$ .
- b) Solve:  $15x^2 - 28 = x$
- c) Solve:  $(2x - 3)(3x + 1) = 0$
- d) Find the value of 'p' so that the quadratic equation  $5px^2 - 8x + 2 = 0$  has real roots.
- e) Solve the following problem:  $x^2 - 55x + 750 = 0$
- f) Without factorization, find the nature of the roots of the quadratic equation.  
 $4x^2 - 12x + 9 = 0$ .
- g) If the roots of the quadratic equation  $2x^2 + 8x + k = 0$  are equal roots then find the value of  $k$ .
- h) Solve the quadratic equation by factorization:  
 $x^2 - x - a(a + 1) = 0$
- i) State whether the following equation is quadratic equation in  $x$ ?  
 $(2x + 3)(3x + 2) = 6(x - 1)(x - 2)$
- j) Show that the equation  $3x^2 + 7x + 8 = 0$  is not true for any real value of  $x$ .

5. 1 mark quadratic

- a) Form a quadratic equation whose roots are 2 and 3.
- b) Check whether it is quadratic equation:  
 $(x + 1)^3 = x^3 + x + 6$
- c) Find the discriminant of the quadratic equation  $3\sqrt{3}x^2 + 10x + \sqrt{3} = 0$
- d) Solve:  $x^2 + 12x + 35 = 0$
- e) Show that  $x = -3$  is a solution of  $x^2 + 6x + 9 = 0$ .
- f) Find the nature of the roots of the quadratic equation:  $x^2 - x + 2 = 0$
- g) Find the discriminant of the Quadratic Equation:  
 $3x^2 + 2x - 1 = 0$
- h) Find the nature of the roots of the quadratic equation:  $2x^2 - 8x + 5 = 0$
- i) If the quadratic equation  $px^2 - 2\sqrt{5}px + 15 = 0$  has two equal roots then find the value of  $p$ .
- j) Find the roots of the quadratic equation:  
 $a^2b^2x^2 + b^2x - a^2x - 1 = 0$

6. 2 mark Real no

- a) Show that  $5 - 2\sqrt{3}$  is an irrational number.
- b) Express  $2.\bar{4}$  as a fraction in simplest form.
- c) Define HCF of two positive integers and find the HCF of the pairs of numbers: 105 and 120.
- d) Explain why  $3 \times 5 \times 7 + 7$  is a composite number.
- e) Find the HCF and LCM of 126 and 156 using prime factorisation method.
- f) Use Euclid's division algorithm to find the HCF of 136, 170 and 255.
- g) Using Euclid's division algorithm, find the HCF of 960 and 1575.
- h) Using Euclid's division lemma, show that the cube of any positive integer is of the form  $9m$  or  $(9m + 1)$  or  $(9m + 8)$  for some integer  $m$ .
- i) Show that every positive even integer is of the form  $2q$  and that every positive odd integer is of the form  $2q + 1$  for some integer  $q$ .
- j) Find the HCF of the following polynomials:  $18(x^3 - x^2 + x - 1)$ ,  $12(x^4 - 1)$

7. 2 mark polynomial

- a) If the zeros of the polynomial  $f(x) = 2x^3 - 15x^2 + 37x - 30$  are in A.P., find them.
- b) Form a quadratic polynomial whose zeroes are  $\frac{3-\sqrt{3}}{5}$  and  $\frac{3+\sqrt{3}}{5}$ .

- c) If  $\alpha$  and  $\beta$  are the zeros of a quadratic polynomial such that  $\alpha + \beta = 24$  and  $\alpha - \beta = 8$ , find a quadratic polynomial having  $\alpha$  and  $\beta$  as its zeros.
- d) Obtain all other zeros of  $(x^4 + 4x^3 - 2x^2 - 20x - 15)$  if two of its zeros are  $\sqrt{5}$  and  $-\sqrt{5}$ .
- e) Find a quadratic polynomial whose sum and product are  $-2\sqrt{3}$ ,  $-9$  respectively hence find the zeroes.
- f) Find a quadratic polynomial of the given numbers as the sum and product of its zeroes respectively.  
 $\frac{1}{4}, -1$
- g) Find the quadratic polynomial, sum of whose zeros is 0 and their product is -1. Hence, find the zeros of the polynomial.
- h) Find the quadratic polynomial, the sum of whose zeros is  $\left(\frac{5}{2}\right)$  and their product is 1. Hence, find the zeros of the polynomial.
- i) If  $\alpha$  and  $\beta$  are the zeros of the quadratic polynomial  $f(x) = ax^2 + bx + c$ , then evaluate:  
 $\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta$ .
- j) If  $\alpha$  and  $\beta$  are the zeros of the quadratic polynomial  $f(x) = ax^2 + bx + c$ , then evaluate:  $\frac{1}{\alpha} - \frac{1}{\beta}$ .

#### 8. 2 mark linear

- a) In a competitive examination, one mark is awarded for each correct answer while  $\frac{1}{2}$  mark is deducted for every wrong answer. Jayanti answered 120 questions and got 90 marks. How many questions did she answer correctly.
- b) Solve the following systems of equations:  
$$x + \frac{y}{2} = 4$$
$$\frac{x}{3} + 2y = 5$$
- c) 8 chairs and 5 tables for a classroom cost Rs 10500, while 5 chairs and 3 tables cost Rs 6450. Find the cost of each chair and that of each table.
- d) Solve the following systems of equations:  
$$\frac{2}{x} + \frac{5}{y} = 1$$
$$\frac{60}{x} + \frac{40}{y} = 19$$
- e) Solve the following pair of linear equations:  $152x - 378y = -74$ ,  $-378x + 152y = -604$ .
- f) Solve the following systems of equations:  
$$x + 2y = \frac{3}{2}$$
$$2x + y = \frac{3}{2}$$
- g) Find the value of k for which the following system of equations has no solution:  
$$kx + 3y = -3$$
$$12x + ky = 6$$
- h) A lab assistant has a solution of 50% acid and other which has 25% acid. How much of each should be mixed to make 10 litres of a 40% acid solution?
- i) Solve for x and y:  $\frac{x+1}{2} + \frac{y-1}{3} = 8$ ,  $\frac{x-1}{3} + \frac{y+1}{2} = 9$
- j) Two numbers are in the ratio 5:6. If 8 is subtracted from each of the numbers, the ratio becomes 4:5. Find the numbers.

#### 9. 2 mark Quadratic

- a) The area of a rectangular plot is  $528 \text{ m}^2$ . The length of the plot (in metres) is one more than twice its breadth. Formulate the quadratic equation to determine the length and breadth of the plot.
- b) Find the value of k for which the quadratic equation  $(k + 4)x^2 + (k + 1)x + 1 = 0$  has equal roots.
- c) If the equation  $(1 + m^2)x^2 + 2mcx + (c^2 - a^2) = 0$  has equal roots, prove that  $c^2 = a^2(1 + m^2)$ .
- d) The sum of ages (in years) of a son and his father is 35 years and product of their ages is 150 years, find their ages.
- e) If the roots of the equation  $(c^2 - ab)x^2 - 2(a^2 - bc)x + b^2 - ac = 0$  are equal, prove that either  $a = 0$  or  $a^3 + b^3 + c^3 = 3abc$ .
- f) A motorboat whose speed in still water is 18 km/h, takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

- g) Solve the quadratic equation  $(x-1)^2 - 5(x-1) - 6 = 0$ .
- h) Find a natural number whose square diminished by 84 is equal to thrice of 8 more than the given number.
- i) Solve:  $3x^2 + 5\sqrt{5}x - 10 = 0$
- j) Find the values of  $k$  for which the quadratic equation  $9x^2 - 3kx + k = 0$  has equal roots.