



## 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  $(\frac{5}{2})$  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.