



## Octahedral classes, kharadi

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

### Class 10 - Mathematics

### Maths 1-4 practice set 2

Maximum Marks: 70

Time Allowed: 3 hours

#### Section A

#### 1. Real no 3 marks

- Find the HCF of 180, 252 and 324 by using Euclid's division lemma.
- If the HCF of 657 and 963 is expressible in the form of  $657x + 963 \times (-15)$ , find the value of  $x$ .
- Prove that  $3 + 2\sqrt{5}$  is irrational.
- There are 156, 208 and 260 students in groups A, B and C respectively. Buses are to be hired to take them for a field trip. Find the minimum number of buses to be hired, if the same number students should be accommodated in each bus.
- Find the LCM and HCF of 26 and 91 and verify that  $\text{LCM} \times \text{HCF} = \text{product of two numbers}$ .
- Use Euclid Division Lemma to show that cube of any positive integer is either of the form  $9m$ ,  $(9m + 1)$  or  $(9m + 8)$ .
- Define HCF of two positive integers and find the HCF of the pairs of numbers: 475 and 495.
- In a school there are two sections, namely A and B, of class X. There are 30 students in section A and 28 students in section B. Find the minimum number of books required for their class library so that they can be distributed equally among students of section A or section B.
- Find the LCM of the following polynomials:  $a^8 - b^8$  and  $(a^4 - b^4)(a + b)$
- Find the LCM of the following polynomials:  $x(8x^3 + 27)$  and  $2x^2(2x^2 + 9x + 9)$

#### 2. polynomials 3 mark

- On dividing  $x^3 - 3x^2 + 3x - 2$  by a polynomial  $g(x)$ , the quotient and remainder are  $(x - 2)$  and 0 respectively. Find  $g(x)$ .
- Divide the polynomial  $f(x) = 3x^2 - x^3 - 3x + 5$  by the polynomial  $g(x) = x - 1 - x^2$  and verify the division algorithm.
- If  $\alpha, \beta$  are the zeros of the polynomial  $2x^2 - 4x + 5$ . find the value of (i)  $\alpha^2 + \beta^2$  (ii)  $(\alpha - \beta)^2$ .
- Find all the zeros of the polynomial  $x^4 - 3x^3 + 6x - 4$ , if two of its zeros are  $\sqrt{2}$  and  $-\sqrt{2}$ .
- Obtain all the zeroes of  $x^4 - 7x^3 + 17x^2 - 17x + 6$ , if two of its zeroes are 3 and 1.
- Find the polynomial of least degree which should be subtracted from the polynomial  $x^4 + 2x^3 - 4x^2 + 6x - 3$  so that it is exactly divisible by  $x^2 - x + 1$ .
- Find all the zeros of  $(2x^4 - 3x^3 - 5x^2 + 9x - 3)$ , it being given that two of its zeros are  $\sqrt{3}$  and  $-\sqrt{3}$ .
- If one root of the quadratic polynomial  $2x^2 - 3x + p$  is 3, find the other root. Also, find the value of  $p$ .
- Find all the zeros of the polynomial  $f(x) = 2x^4 - 3x^3 - 3x^2 + 6x - 2$ , if two of its zeros are  $\sqrt{2}$  and  $-\sqrt{2}$ .
- Find the zeros of  $p(y) = y^2 + \frac{3\sqrt{5}}{2}y - 5$  and verify the relationship between the zeros and their coefficients.

#### 3. linear 3 mark

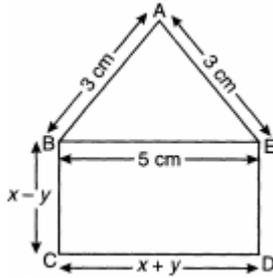
- Solve for  $x$  and  $y$ :  
$$\frac{x+1}{2} + \frac{y-1}{3} = 9; \frac{x-1}{3} + \frac{y+1}{2} = 8$$
- Draw the graphs of the pair of linear equations  $x - y + 2 = 0$  and  $4x - y - 4 = 0$ . Calculate the area of the triangle formed by the lines so drawn and the  $x$ -axis.
- 4 tables and 3 chairs, together, cost Rs.2,250 and 3 tables and 4 chairs cost Rs.1950. Find the cost of 2 chairs and 1 table.

- d) Find the value of  $k$  for which each of the following systems of equations have infinitely many solution:

$$kx + 3y = 2k + 1$$

$$2(k + 1)x + 9y = 7k + 1$$

- e) In the figure below ABCDE is a pentagon with  $BE \parallel CD$  and  $BC \parallel DE$ . BC is perpendicular to CD. If the perimeter of ABCDE is 21 cm, find the Values of  $x$  and  $y$ .

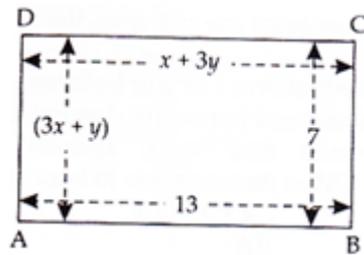


- f) A jeweller has bars of 18-carat gold and 12-carat gold. How much of each must be melted together to obtain a bar of 16-carat gold, weighing 120 g? (Given: Pure gold is 24-carat).
- g) Seven times a two digit number is equal to four times the number obtained by reversing the order of its digits. If the difference between the digits is 3, determine the number.
- h) Determine graphically the coordinates of the vertices of the triangle, the equation of whose sides are  $y = x$ ,  $3y = x$  and  $x + y = 8$ .
- i) In the following system of equations determine whether the system has a unique solution, no solution or infinitely many solutions. In case there is a unique solution, find it.

$$2x + 3y = 7$$

$$6x + 5y = 11$$

- j) Find the values of  $x$  and  $y$  in the following rectangle:



#### 4. Quadratic 3 mark

a) Solve:  $\frac{3}{x+1} - \frac{1}{2} = \frac{2}{3x-1}, x \neq -1, \frac{1}{3}$

- b) Some students planned a picnic. The total budget for hiring a bus was Rs. 1440. Later on, eight of these refused to go and instead paid their total share of money towards the fee of one economically weaker student of their class, and thus, the cost for each member who went for picnic, increased by Rs. 30.

i. How many students attended the picnic?

ii. How much money in total was paid towards the fee? Which value is reflected in this question?

- c) A man is  $3\frac{1}{2}$  times as old as his son. If the sum of the squares of their ages is 1325, find the ages of the father and the son.

- d) Determine, if 3 is a root of the equation given below:

$$\sqrt{x^2 - 4x + 3} + \sqrt{x^2 - 9} = \sqrt{4x^2 - 14x + 16}$$

- e) The angry Arjun carried some arrows for fighting with Bheeshm. With half the arrows, he cut down the arrows thrown by Bheeshm on him and with six other arrows he killed the rath driver of Bheeshm. With one arrow each he knocked down respectively the rath, flag and the bow of Bheeshm. Finally, with one more than four times the square root of arrows he laid Bheeshm unconscious on an arrow bed. Find the total number of arrows Arjun had.

- f) A two digit number is such that the product of its digits is 12. When 36 is added to the number, the digits interchange their places. Formulate the quadratic equation root of which is digit of the number.

- g) Determine whether the given quadratic equation have real roots and if so, find the roots

$$16x^2 = 24x + 1$$

h) For what value of k, are the roots of the quadratic equation  $kx(x - 2) + 6 = 0$  equal?

i) Solve:  $2\left(\frac{2x-1}{x+3}\right) - 3\left(\frac{x+3}{2x-1}\right) = 5, x \neq -3, \frac{1}{2}$

j) Solve:

$$x = \frac{1}{2 - \frac{1}{2 - \frac{1}{2-x}}}, x \neq 2$$

#### 5. Quadratic 4 mark

- a) A train travels at a certain average speed for a distance of 54 km and then travels a distance of 63 km at an average speed of 6 km/h more than the first speed. If it takes 3 hours to complete the total journey, what is its first speed?
- b) At t minutes past 2 p.m., the time needed by the minute hand of a clock to show 3 p.m. was found to be 3 minutes less than  $\frac{t^2}{4}$  minutes. Find t.
- 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) A train travels 360 km at a uniform speed. If, the speed had been 5 km/hr more, it would have taken 1 hour less for the same journey. Find the speed of the train.
- e) Find the roots of the given quadratic equation if they exist by the method of completing square:  
 $4x^2 + 4\sqrt{3}x + 3 = 0$
- f) Solve for x:  
 $\frac{1}{(x-1)(x-2)} + \frac{1}{(x-2)(x-3)} = \frac{2}{3}; x \neq 1, 2, 3$
- g) The length of the hypotenuse of a right-angled triangle exceeds the length of the base by 2 cm and exceeds twice the length of the altitude by 1 cm. Find the length of each side of the triangle.
- h) The length of the sides forming right angle of a right triangle are 5x cm and (3x - 1)cm. If the area of the triangle is 60 cm<sup>2</sup>. Find its hypotenuse.
- i) Sum of the areas of two squares is 468 m<sup>2</sup>. If the difference of their perimeters is 24 m, find the sides of the two squares.
- j) The diagonal of a rectangular field is 60 metres more than the shorter side. If the longer side is 30 metres more than the shorter side, find the sides of field.

#### 6. linear 4 mark

- a) A shopkeeper sells a saree at 8% profit and a sweater at 10% discount, thereby getting a sum of Rs.1008. If she had sold the saree at 10% profit and the sweater at 8% discount, she would have got Rs.1028. Find the cost price of the saree and the list price (price before discount) of the sweater.
- b) A person invested some amount at the rate of 12% simple interest and the remaining at 10%. He received yearly interest of ₹ 130 but if he had interchanged the amount invested, he would have received ₹ 4 more as the interest. How much money did he invest at different rates?
- c) If we add 1 to the numerator of a fraction, it reduces to  $\frac{1}{2}$ . If we subtract 1 from the denominator, it reduces to  $\frac{1}{3}$ . Represents This situation algebraically and graphically.
- d) If 2 is subtracted from the numerator and 1 is added to the denominator, a fraction becomes  $\frac{1}{2}$  but when 4 is added to the 2 numerator and 3 is subtracted from the 3 denominator, it becomes  $\frac{3}{2}$ . Find the fraction.
- e) The ratio of incomes of two persons is 11 : 7 and the ratio of their expenditures is 9 : 5. If each of them manages to save Rs 400 per month, find their monthly incomes.
- f) Solve for x and y :  $4x + \frac{6}{y} = 15; x - \frac{4}{y} = 7, y \neq 0$ . Hence find the value of p if  $2y = 3px + 7$ .
- g) It can take 12 hours to fill a swimming pool using two pipes. If the pipe of larger diameter is used for four hours and the pipe of smaller diameter for 9 hours, only half of the pool can be filled. How long would it take for each pipe to fill the pool separately?
- h) Half the perimeter of a rectangular garden, whose length is 4 m more than its width, is 36 m. find the dimensions of the garden.
- i) If a bag containing red and white balls, half the number of white balls is equal to one-third the number of red balls. Thrice the total number of balls exceeds seven times the number of white balls by 6. How many balls of each colour does the bag contain?

- j) Father's age is three times the sum of the ages of two children. After 5 years his age will be twice the sum of the ages of two children. Find the age of the father.

7. Quadratic 4 mark

- a) The length of the hypotenuse of a right triangle exceeds the length of its base by 2 cm and exceeds twice the length of altitude by 1 cm. Find the length of each side of the triangle.
- b) A rectangular park is to be designed whose breadth is 3 m less than its length. Its area is to be 4 sq m more than the area of park that has already been made in the shape of an isosceles triangle with its base as the breadth of the rectangular park and altitude 12 m. Find the length and breadth of the rectangular park .
- c) The difference of squares of two numbers is 180. The square of the smaller number is 8 times the larger number. Find the two number
- d) Find for x  $\frac{1}{x-2} + \frac{2}{x-1} = \frac{6}{x}; x \neq 0, 1, 2$
- e) A man travels a distance of 300 km at a uniform speed. If the speed of the train is increased by 5 km an hour, the journey would have taken two hours less. Find the original speed of the train.
- f) A piece of cloth costs 200 Rupees . If the piece was 5 m longer and each metre of cloth costs 2 Rupees less, the cost of the piece would have remain unchanged. How long is the piece and what is the original rate per metre?
- g) If the roots of the quadratic equation  $(c^2 - ab)x^2 - 2(a^2 - bc)x + b^2 - ac = 0$  in x are equal then show that either a = 0 or  $a^3 + b^3 + c^3 = 3abc$
- h) If the roots of the quadratic equation  $(x - a)(x - b) + (x - b)(x - c) + (x - c)(x - a) = 0$  are equal. Then show that a = b = c
- i) A rectangular field is 20 m long and 14 m wide. There is a path of equal width all around it, having an area of 111 sq m. Find the width of the path.
- j) The diagonal of a rectangular field is 60 metres more than the shorter side. If, the longer side is 30 metres more than the shorter side, find the sides of the field.