CHAPTER 1 – Real Numbers

# Exam Practice

Real Numbers

## Very Short Answer (VSA) Type Questions [1 Mark each]

1. State the Euclid's division lemma.
2. A number when divided by 61 gives 27 as quotient and 32 as remainder. Find the number.
3. By what number should 1365 be divided to get 31 as quotient and 32 as remainder?
4. The product of three consecutive positive integers is divisible by 6. Is this statement true or false? Justify your answer.
**NCERT Exemplar**
5. Find the largest number which divides 70 and 125 leaving remainders 5 and 8, respectively. **NCERT Exemplar**
6. If $d$ = HCF (48, 72), find the value of $d$.
**CBSE 2011**
7. If the HCF of 65 and 117 is expressible in the form $65m - 117$, then find the value of $m$.
**NCERT Exemplar**
8. HOTS In Euclid's division lemma, the value of $r$, when a positive integer $a$ is divided by 3, are 0 and 1 only. Is this statement true or false? Justify your answer.
**NCERT Exemplar**
9. HOTS On GT road, three consecutive traffic lights change after 36, 42 and 72 s. If the lights are first switched on at 9 : 00 am, then at what time will they change simultaneously? **CBSE 2012**
10. HOTS For what value of $n$, $2^n \times 5^n$ ends with 5?
11. HOTS Can the number $6^n$, where $n$ being a natural number, ends with digit 5? Give reason. **NCERT Exemplar**
12. HOTS Can two numbers have 18 as their HCF and 380 as their LCM? Give reason.
**NCERT Exemplar**

## Short Answer (SA) Type I Questions [2 Marks each]

13. Write the HCF and LCM of the smallest odd composite number and the smallest odd prime number. If an odd number $p$ divides $q^2$, then will it divide $q^3$ also? Explain.
**CBSE 2015**
14. Check whether $15^n$ can end with digit zero for any natural number $n$. **CBSE 2012, 11**
15. Prove that $2 + \sqrt{5}$ is an irrational number.
**CBSE 2014**
16. A rational number in its decimal expansion is 327.7081. What can you say about the prime factors of $q$, when this number is expressed in the form $\frac{p}{q}$? Give reason.
**CBSE 2012; NCERT Exemplar**
17. HOTS Find the least number that is divisible by all the numbers from 1 to 5 (both inclusive).
18. HOTS A forester wants to plant 66 mango trees, 88 orange trees and 110 apple trees in equal rows (in terms of number of trees). Also, he wants to make distinct rows of trees (i.e. only one type of trees in one row). Find the number of minimum rows.
19. HOTS Without actually performing the long division, find $\frac{987}{10500}$ will have terminating or non-terminating (repeating) decimal expansion. Give reason for your answer.
**CBSE 2009; NCERT Exemplar**

EXAM PRACTICE

## Short Answer (SA) Type II Questions [3 Marks each]

20. Write whether the square of any positive integer can be of the form $3m + 2$, where $m$ is a natural number. Justify your answer.
**NCERT Exemplar; CBSE 2012, 10**

21. Show that the square of any positive integer cannot be of the form $5q + 2$ or $5q + 3$ for any integer $q$.
**NCERT Exemplar; CBSE 2011, 10**

22. Prove that one of any three consecutive positive integer must be divisible by 3.
**NCERT Exemplar**

23. Use Euclid's division algorithm, to find the largest number, which divides 957 and 1280 leaving remainder 5 in each case.
**CBSE 2012**

24. The numbers 525 and 3000 are both divisible by 3, 5, 15, 25 and 75. What is the HCF of 525 and 3000? Justify your answer. **NCERT Exemplar**

25. Ravi and Shikha drive around a circular sports field. Ravi takes 16 min to complete one round, while Shikha completes the round in 20 min. If both start at the same point, at the same time and go in the same direction, then after how much time will they meet at the starting point? **CBSE 2012**

26. Six bells commence tolling together and toll at intervals 2, 4, 6, 8, 10 and 12 min, respectively. After how many minutes they will toll together?

27. HOTS If $n$ is an odd integer, then show that $n^2 - 1$ is divisible by 8. **NCERT Exemplar**

28. HOTS Find the greatest number which on dividing 1657 and 2037 leaves remainders 6 and 5, respectively. **CBSE 2010, 08**

29. HOTS State whether $1.2\overline{3} + \frac{3}{4}$ is a rational number or not.

30. HOTS If $q$ is prime, then prove that $\sqrt{q}$ is an irrational number.

31. HOTS Prove that $(\sqrt{p} + \sqrt{q})$ is irrational, where $p$ and $q$ are primes. **NCERT Exemplar**

## Long Answer (LA) Type Questions [4 Marks each]

32. If the HCF of 657 and 963 is expressible in the form of $657x + 963(-15)$, find $x$.
**CBSE 2010**

33. HOTS Find the HCF of 55 and 210. Express it as a linear combination of 55 and 210, i.e. HCF of 55 and 210 $= 210a + 55b$, for some $a$ and $b$.

34. HOTS If $\sqrt{ab}$ is an irrational number, prove that $(\sqrt{a} + \sqrt{b})$ is an irrational number.

35. HOTS Prove that, if $a$, $b$, $c$ and $d$ are positive rationals such that $a + \sqrt{b} = c + \sqrt{d}$, then either $a = c$ and $b = d$ or $b$ and $d$ are squares of rationals.

Chapter – 2 Polynomials

# Exam Practice

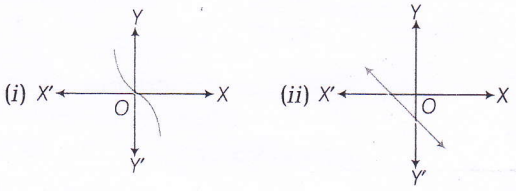
Polynomials

## Very Short Answer (VSA) Type Questions [1 Mark each]

1. Find the degree of the polynomial $\frac{-t^9 + 4t^6 + 7t^5}{t^5}$.

2. For what value of $k$, $-2$ is a zero of the polynomial $3x^2 + 4x + 2k$? **CBSE 2010**

3. The graphs of $y = p(x)$, where $p(x)$ is a polynomial in $x$ are given. Find the number of zeroes of $p(x)$ in each case. For each case, also state whether $p(x)$ is linear or quadratic.




4. Is the following statement True or False? Justify your answer. 'If the zeroes of a quadratic polynomial $ax^2 + bx + c$ are both negative, then $a$, $b$ and $c$ all have the same sign.' **NCERT Exemplar**

5. If one zero of $2x^2 - 3x + k$ is reciprocal to the other, then find the value of $k$. **CBSE 2010**

6. If sum of the squares of zeroes of the quadratic polynomial $f(x) = x^2 - 4x + k$ is 20, then find the value of $k$.

7. Find the quadratic polynomial whose zeroes are $\sqrt{3} + \sqrt{5}$ and $\sqrt{5} - \sqrt{3}$ **CBSE 2014**

8. **HOTS** If the zeroes of the quadratic polynomial $ax^2 + bx + c$, where $c \neq 0$, are equal, then show that $c$ and $a$ have same sign. **NCERT Exemplar**

9. **HOTS** Can $(x - 1)$ be the remainder on division of a polynomial, $p(x)$ by $(2x + 3)$? Justify your answer. **NCERT Exemplar**

## Short Answer (SA) Type I Questions [2 Marks each]

10. Write whether the following expressions are polynomials or not. Give reasons for your answer.

(i) $x^3 + \frac{1}{x^2} + \frac{1}{x} + 1$ (ii) $x^2 + x + 3$

(iii) $y^{-1/2} - 3y + 2$ (iv) $\sqrt{2}\,y^3 + \sqrt{3}\,y$

11. If one zero of the polynomial $(a^2 + 9)x^2 + 13x + 6a$ is reciprocal of the other, then find the value of $a$. **CBSE 2015, 08**

12. If $\alpha$ and $\beta$ are zeroes of the quadratic polynomial $p(x) = x^2 - (k + 6)x + 2(2k - 1)$, then find the value of $k$, if $\alpha + \beta = \frac{\alpha\beta}{2}$ **CBSE 2011**

13. If the zeroes of the polynomial $x^2 + px + q$ are double in value to the zeroes of $2x^2 - 5x - 3$, then find the values of $p$ and $q$. **CBSE 2012**

14. If the zeroes of the cubic polynomial $x^3 - 6x^2 + 3x + 10$ are of the form $a$, $a + b$ and $a + 2b$ for some real numbers $a$ and $b$, then find the values of $a$ and $b$. **NCERT Exemplar**

15. Form a quadratic polynomial, whose one zero is 8 and the product of zeroes is $-56$. **CBSE 2012**

16. **HOTS** The sum of remainders obtained when $x^3 + (k + 8)x + k$ is divided by $x - 2$ and when it is divided by $x + 1$, is 0. Find the value of $k$.

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## Short Answer (SA) Type II Questions [3 Marks each]

17. If $\alpha$ and $\beta$ are the zeroes of the quadrat polynomial $f(x) = ax^2 + bx + c$, then evaluate $\frac{1}{\alpha} - \frac{1}{\beta}$.

18. Find the zeroes of the following polynomial by factorisation method and verify the relations between the zeroes and their coefficients

(i) $7y^2 - \frac{11}{3}y - \frac{2}{3}$ (ii) $\sqrt{3}x^2 + 10x + 7\sqrt{3}$

(iii) $4\sqrt{3}x^2 + 5x - 2\sqrt{3}$ **CBSE 2011**

19. It is given that 1 is one of the zeroes of the polynomial $7x - x^3 - 6$. Find its other zeroes. **CBSE 2011**

20. If the sum of the zeroes of the polynomial $p(x) = (a+1)x^2 + (2a+3)x + (3a+4)$ is $-1$, then find the product of its zeroes. **CBSE 2012**

21. Find the quadratic polynomial, whose zeroes are in the ratio 2 : 3 and their sum is 15. **CBSE 2012**

22. Given that, $x^2 + 2x - 3$ is a factor of $f(x) = x^4 + 6x^3 + 2ax^2 + bx - 3a$. Find the values of $a$ and $b$. **CBSE 2012**

23. If $(x + a)$ is a factor of two polynomials $x^2 + px + q$ and $x^2 + mx + n$, then prove that $a = \frac{n-q}{m-p}$. **CBSE 2011**

24. **HOTS** Can the quadratic polynomial $x^2 + kx + k$ have equal zeroes for some odd integer $k > 1$? **NCERT Exemplar**

## Long Answer (LA) Type Questions [5 Marks each]

25. If the polynomial $6x^4 + 8x^3 + 17x^2 + 21x + 7$ is divided by another polynomial $3x^2 + 4x + 1$, then what will be the quotient and remainder? **CBSE 2011**

26. Find other zeroes of the polynomial $2x^4 - 3x^3 - 5x^2 + 9x - 3$, if it is given that two of its zeroes are $-\sqrt{3}$ and $\sqrt{3}$ respectively. **CBSE 2011**

27. **HOTS** If the zeroes of the polynomial $ax^2 + bx + b = 0$ are in the ratio $m : n$, then find the value of $\sqrt{\frac{m}{n}} + \sqrt{\frac{n}{m}}$.

28. **HOTS** If $\alpha$ and $\beta$ are the zeroes of the quadrati polynomial $f(x) = px^2 + qx + r$, then evaluate $\frac{1}{p\alpha + q} + \frac{1}{p\beta + q}$.

29. **HOTS** If $\alpha$ and $\beta$ are the zeroes of the quadrati polynomial $p(s) = 3s^2 - 6s + 4$, then find the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha} + 2\left(\frac{1}{\alpha} + \frac{1}{\beta}\right) + 3\alpha\beta$.

30. **HOTS** If $\alpha$ and $\beta$ are the zeroes of the quadrati polynomial $f(x) = x^2 - px + q$, then prove that $\frac{\alpha^2}{\beta^2} + \frac{\beta^2}{\alpha^2} = \frac{p^4}{q^2} - \frac{4p^2}{q} + 2$.

ICE

Chapter – 3 Linear Equation in two variables

# Exam Practice

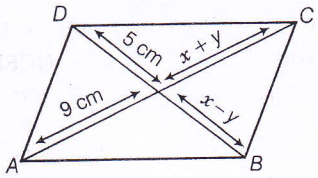
Linear Equation in two Variables

## Very Short Answer (VSA) Type Questions [1 Mark each]

1. Find the solution of pair of equations $y = 0$ and $y = -6$.
2. Find nature of the lines representing the linear equations $2x - y = 3$ and $4x - y = 5$.
3. Do the equations $x + 3y - 1 = 3$ and $2x + 6y = 6$ represent a pair of coincident lines? Justify your answer.

**Directions** (Q.Nos 4-7) Without drawing them, find out whether the line, representing the following pairs of linear equations intersect at a point or parallel or coincide.

4. $5x - 4y + 8 = 0; 7x + 6y - 9 = 0$
5. $6x - 3y + 10 = 0; 2x - y + 9 = 0$
6. $9x + 3y + 12 = 0; 18x + 6y + 24 = 0$
7. $2x - y = 2; 2y - 4x = 2$
8. Find the number of solutions of the pair of equations $x + 2y + 5 = 0$, $-3x - 6y + 1 = 0$
9. For which values of $c$, the pair of equations $2x + 2y = 8$ and $8x + 10y = c$ have a unique solution?
10. Obtain the condition for the following pair of linear equations to have a unique solution.
$ax + by = c$ and $lx + my = n$
11. What should be the value of $\lambda$, for the given equations to have infinitely many solutions?
$5x + \lambda y = 4$ and $15x + 3y = 12$
12. For which value of $p$, the pair of equations $6x + 5y = 4$ and $12x + py = -8$ has no solution?
13. Find the value of $k$, so that the following system of equations has no solution.
$3x - y - 5 = 0$, $6x - 2y - k = 0$
14. Find the value of $x + y$, if $3x - 2y = 5$ and $3y - 2x = 3$.
15. If $x = a$, $y = b$ is the solution of the equations $x - y = 2$ and $x + y = 4$, then find the values of $a$ and $b$. **NCERT Exemplar**
16. **HOTS** In the given figure, $ABCD$ is parallelogram. Find the values of $x$ and $y$.




## Short Answer (SA) Type I Questions [2 Marks each]

17. For which values of $p$ and $q$, will the following pair of linear equations have infinitely many solutions?
$4x + 5y = 2$,
$(2p + 7q)x + (p + 8q)y = 2q - p + 1$
**NCERT Exemplar**
18. For what value of k, the pair of equations $kx + 2y = 5$, $3x - 4y = 10$ has no solution?
19. Show that the pair of linear equations $x = 2y$ and $y = 2x$ have unique solution at $(0, 0)$. Justify your answer.
20. Equation $2x = 5y + 4$ is given. Write another linear equation, so that the lines represented by the pair are
(i) intersecting
(ii) coincident
(iii) parallel
21. Determine the values of $a$ and $b$, for which the following pairs of linear equations has infinitely many solutions
$3x - (a + 1)y = 2b - 1$
and $5x + (1 - 2a)y = 3b$
22. Two straight paths are represented by the lines $7x - 5y = 3$ and $14x - 10y = 5$. Check whether the paths cross each other.

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**Directions** (Q.Nos 25-26) Solve the following pair of equations by substitution method.

23. $\frac{3}{2}x - y = \frac{1}{4}; x + \frac{1}{2}y = 1$

24. $3x + y = 4; 2(y - 5) = -5x$

25. $14x + 3.9y = 6.4; 0.2x - 1.3y = 1.2$

26. $0.1x - 0.2y = 2; x + y = 17$

**Directions** (Q.Nos 27-32) Solve the pair of equations by elimination method.

27. $3x - 4y = 11; 7x - 5y = 4$

28. $2x + 3y - 5 = 0; 3x - 2y - 14 = 0$

29. $3x + 2y = 7; 2x - 5y + 8 = 0$

30. $11x + 15y + 23 = 0; 7x - 2y - 20 = 0$

31. $0.4x + 0.3y = 1.7; 0.7x - 0.2y = 0.8$

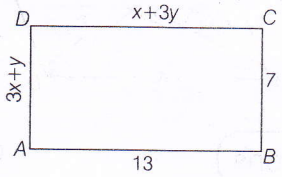
32. $\frac{x}{7} + \frac{y}{3} = 5; \frac{x}{7} - \frac{y}{9} = 1$

**Directions** (Q.Nos 33-34) Solve the pair of linear equations by cross-multiplication method.

33. $2x - 21 = 5y; 3 + 4y = -3x$

34. $4x + y = -1; 7x + y = -4$

35. Find the values of $x$ and y in the given rectangle. **NCERT Exemplar**




36. The sum of two numbers is 120 and one of the numbers is 3 times the other. Find the value of the numbers.

37. The combined ages of two people is 34. If one person is 6 yr younger than the other, then find their ages.

38. Father's age is 3 times the sum of ages of his two children. After 5 yr, his age will be twice the sum of ages of the two children. Find the age of father. **CBSE 2011, 10**

39. **HOTS** Find $a$, if the line $3x + ay = 8$ passes through the intersection of lines represented by equations $3x - 2y = 10$ and $5x + y = 8$.

40. **HOTS** There are some students in the two examination halls $A$ and $B$. To make the number of students equal in each hall, 10 students are sent from $A$ to $B$.

But if 20 students are sent from $B$ to $A$, the number of students in $A$ becomes double the number of students in $B$.

Find the number of students in the two halls. **NCERT Exemplar**

41. **HOTS** If the angles of a triangle are $x$, y and 40° and the difference between the two angles $x$ and y is 30°. Then, find the values of $x$ and y. **NCERT Exemplar**

## Short Answer (SA) Type II Questions

**[3 Marks each]**

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42. Draw the graph 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. **NCERT Exemplar**

43. Draw the graph of lines $x = -2$ and $y = 3$. Write the vertices of the figure formed by these lines, $X$-axis and $Y$-axis. Also, find the area of the figure. **NCERT Exemplar**

44. For which value(s) of $\lambda$, does the pair of linear equations $\lambda x + y = \lambda^2$ and $x + \lambda y = 1$ have

(i) no solution?

(ii) infinitely many solutions?

(iii) a unique solution? **NCERT Exemplar**

45. Find the values of $a$ and $b$ for which the following system of linear equations has infinite number of solutions.

$(a + b)x - 2by = 5a + 2b + 1$

and $3x - y = 14$ **CBSE 2012**

**46.** Show that the following system of equations has an unique solution.

$$3x + 5y = 12,\ 5x + 3y = 4$$

Also, find the solution of the given system of equations. **NCERT Exemplar**

**Directions** (Q.Nos 47-48)

**47.** $\frac{x}{a} + \frac{y}{b} = a + b;\ \frac{x}{a^2} + \frac{y}{b^2} = 2,\ a, b \neq 0$

**CBSE 2010; NCERT Exemplar**

**48.** $ax + by = 1;\ bx + ay = \frac{2ab}{a^2 + b^2}$ **CBSE 2010**

**49.** Two chairs and three tables cost ₹ 5650 whereas three chairs and two tables cost ₹ 7100. Find the cost of a chair and a table separately. **NCERT Exemplar**

**50.** Solve the following system of equations

$$\frac{27}{x+y} - \frac{15}{x-y} = -2$$

and $$\frac{30}{x+y} - \frac{1}{x-y} = 3$$

**51.** A sailor goes 8 km downstream in 40 min and comes back in 1 h. Find the speed of sailor in still water and the speed of current. **CBSE 2010**

**52.** HOTS Solve graphically, the pair of equations $2x + y = 6$ and $2x - y + 2 = 0$. Find the ratio of the areas of the two triangles formed by the lines representing these equations with X-axis and the lines with Y-axis.

**53.** HOTS (i) Determine algebraically, the vertices of the triangle formed by the lines

$3x - y = 3, 2x - 3y = 2$

and $x + 2y = 8$. **NCERT Exemplar**

(ii) $5x - y = 5, 6x + y = 17$ and $x + 2y = 1$ **NCERT Exemplar**

**54.** HOTS Find the point of intersection of lines

$$2ax - by = 2a^2 - b^2$$

and $$ax + 2by = a^2 + 2b^2$$

by eliminating the variables. Show that the system of equations is concurrent with the line represented by equation

$$(a - b)x + (a + b)y = a^2 + b^2.$$

**55.** HOTS The angles of a cyclic quadrilateral $ABCD$ are $\angle A = (6x + 10)°$, $\angle B = (5x)°$, $\angle C = (x + y)°$ and $\angle D = (3y - 10)°$. Find x and y and then the values of the four angles. **NCERT Exemplar**

**56.** HOTS $A$ and $B$ each have a certain number of mangoes. $A$ says to $B$, if you give 30 of your mangoes, I will have twice as many as left with you. $B$ replies, if you give me 10, I will have thrice as many as left with you. How many mangoes does each have?

**57.** HOTS The sum of a two-digit number and number obtained by reversing the order of digits is 99. If the digits of the number differ by 3, then find the numbers. **CBSE 2010**

**58.** HOTS If 4 times the area of a smaller square is subtracted from the area of a larger square, the result is 144 $m^2$. The sum of the area of the two squares is 464 $m^2$. Determine the side of the two squares. **CBSE 2010**

**59.** HOTS Solve the system of following equations.

$$\frac{1}{2(2x+3y)} + \frac{12}{7(3x-2y)} = \frac{1}{2}$$

and $$\frac{7}{2x+3y} + \frac{4}{3x-2y} = 2$$

**60.** HOTS Solve the following equations for $x$ and y.

$$7^x + 5^y = 74,\ 7^{x+1} - 5^{y+1} = 218$$

## Long Answer (LA) Type Questions [4 Marks each]

**61.** Determine graphically, the vertices of the triangle formed by the lines

$y = x, 3y = x, x + y = 8$. **NCERT Exemplar**

**62.** 7 canes of a fizzy drink and 5 packets of apple juice cost ₹ 6.80 while 5 canes of the fizzy drink and 11 packets of apple juice cost ₹ 8.20. Calculate the cost of one cane of fizzy drink and one packet of apple juice.

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**63.** $A$ and $B$ are two points 150 km apart on a highway. Two cars start with different speeds from $A$ and $B$ at the same time. If they move in the same direction, they meet in 15 h but if they move in the opposite directions, they meet in 1 h. Find their speed. **CBSE 2012**

**64.** A part of monthly charges in a college is fixed and the remaining depend on the number of days one has taken food in the mess. When a student $X$ takes food for 25 days, he has to pay ₹ 1750 as hostel charges,whereas a student $Y$, who takes food for 28 days, pays ₹ 1900 as hostel charges. Find the fixed charge and the cost of food per day. **CBSE 2010**

**65.** Ankita travels 14 km to her home partly by rickshaw and partly by bus. She takes half an hour, if she travels 2 km by rickshaw and the remaining distance by bus.

On the other hand, if she travels 4 km by rickshaw and the remaining distance by bus, she takes 9 min longer. Find the speed of rickshaw and of the bus. **NCERT Exemplar**

**66.** A man, when asked how many hens and buffaloes he has, told that his animals have 120 eyes and 180 legs. How many hens and buffaloes has he?

**67.** **HOTS** A railway half ticket cost half the full fare but the reservation charges are the same on a half ticket as on a full ticket. One reserved first class ticket from the stations $A$ to $B$ costs ₹ 2530. Also, one reserved first class ticket and one reserved first class half ticket from stations $A$ to $B$ costs ₹ 3810. Find the full first class fare from stations $A$ to $B$ and also the reservation charges for a ticket. **NCERT Exemplar**

**68.** **HOTS** Susan invested certain amount of money in two schemes $A$ and $B$, which offer interest at the rate of 8% per annum and 9% per annum, respectively. She received ₹ 1860 as annual interest. However, had she interchanged the amount of investments in the two schemes, she would received ₹ 20 more as annual interest. How much money did she invest in each scheme? **NCERT Exemplar**

**69.** **HOTS** A bird flying in the same direction as that of the wind, covers a distance of 45 km in 2 h 30 min. But it takes 4 h 30 min to cover the same distance when it flies against the direction of the wind. Ignoring conditions other than the wind conditions, find

(*i*) the speed of the bird in still air.

(*ii*) the speed of the wind. **CBSE 2012**

# Exam Practice

Quadratic Equation

## Very Short Answer (VSA) Type Questions [1 Mark each]

1. If $b = 0, c < 0$, is it true that the roots of $x^2 + bx + c = 0$ are numerically equal and opposite in sign? Justify your answer. **NCERT Exemplar**

2. Does there exist a quadratic equation whose coefficients are rational but both of its roots are irrational? Justify your answer. **NCERT Exemplar**

3. Find the discriminant of quadratic equation $\sqrt{5}x^2 - 7x + 2\sqrt{5} = 0$ **CBSE 2012**

4. Which constant must be added and subtracted to solve the quadratic equation $9x^2 + \frac{3}{4}x - \sqrt{2} = 0$ by the method of completing the square? **NCERT Exemplar**

5. If the discriminant of the equation $kx^2 - 3\sqrt{2}x + 4\sqrt{2} = 0$ is 14, then find the value of $k$.

6. Check whether the following statement is true or false. Justify your answer.
"Every quadratic equation has atleast one real root."

**Directions** (Q. Nos. 7 and 8) What is the nature of roots of the following quadratic equation

7. $5x^2 - 2x - 3 = 0$? **CBSE 2015**

8. $2x^2 - \sqrt{5}x + 1 = 0$? **NCERT Exemplar**

9. If a number is added to twice its square, then the resultant is 21. Write the quadratic representation of this situation. **CBSE 2014, 15**

10. **HOTS** Aquadratic equation with integral coefficients has integral roots. Justify your answer. **NCERT Exemplar**

11. **HOTS** Does there exist a quadratic equation whose coefficients are all distinct irrationals but both the roots are rationals? Why? **NCERT Exemplar**

## Short Answer (SA) Type I Questions [2 Marks each]

12. Which of the following is not a quadratic equation? **NCERT Exemplar**
(*i*) $(\sqrt{2}x + \sqrt{3})^2 = 3x^2 - 5x$
(*ii*) $(x^2 + 2x)^2 = x^4 + 3 + 4x^2$

**Directions** (Q.Nos. 13-15) Solve for x:

13. $x^2 - (\sqrt{5} + 1)x + \sqrt{5} = 0$ **CBSE 2015**

14. $\sqrt{6x + 7} - (2x - 7) = 0$ **CBSE 2016**

15. $\sqrt{2x + 9} + x = 13$ **CBSE 2016**

16. Find the roots of the equation $ax^2 + a = a^2x + x$ **CBSE 2012**

17. Show that $(x^2 + 1)^2 - x^2 = 0$ has no real roots. **NCERT Exemplar**

18. Find the roots of the quadratic equation $a^2b^2x^2 + b^2x - a^2x - 1 = 0$ **CBSE 2012, 11**

19. Find the numerical difference of the roots of equation $x^2 - 7x - 18 = 0$ **CBSE 2015**

20. If $\frac{1}{2}$ is a root of the equation $x^2 + kx - \frac{5}{4} = 0$, then find the value of $k$. **NCERT Exemplar; CBSE 2011**

21. Find the least positive value of $k$ for which $x^2 + kx + 16 = 0$ has real roots. **CBSE 2010**

22. Find the value of $p$, so that the quadratic equation $px(x - 3) + 9 = 0$ has equal roots. **CBSE 2014**

EXAM PRACTICE

**23.** Find the value of $k$ for which the quadratic equation $2x^2 - kx + k = 0$ has equal roots.
**NCERT Exemplar**

**24.** In a cricket match. Harbhajan took three wickets less than twice the number of wickets taken by Zaheer. The product of the numbers of wickets taken by these two is 20. Represent the above situation in th form of a quadratic equation. **CBSE 2015**

**25.** **HOTS** Find the quadratic equation, if $x = \sqrt{5 + \sqrt{5 + \sqrt{5 + \ldots \infty}}}$ and x is a natural number.

## Short Answer (SA) Type II Questions

**[3 Marks each]**

**26.** Find the roots of the following quadratic equation $x^2 - 3\sqrt{5}x + 10 = 0$ **CBSE 2011**

**27.** Solve the following quadratic equation for $x: 4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$ **CBSE 2013, 12**

**28.** Find two consecutive odd natural numbers, sum of whose squares is 130. **CBSE 2013**

**29.** Solve for x: $\frac{16}{x} - 1 = \frac{15}{x+1}$; $x \neq 0, -1$

**30.** Find the value of $p$, when $px^2 + (\sqrt{3} - \sqrt{2})x - 1 = 0$ and $x = \frac{1}{\sqrt{3}}$ is one root of this equation. **CBSE 2013**

**31.** The sum of two number is 11 and the sum of their reciprocals is $\frac{11}{28}$. Find the numbers. **CBSE 2013**

**32.** The difference of two numbers is 4. If the difference of their reciprocals is $\frac{4}{21}$, then find the two numbers. **CBSE 2008**

**33.** The sum of two numbers is 9 and the sum of their reciprocals is $\frac{1}{2}$. Find the numbers. **CBSE 2009**

**34.** At $t$ min past 2 pm, the time needed by the minute hand of a clock to show 3 pm was found to be 3 min less than $\frac{t^2}{4}$ min.
Find $t$. **NCERT Exemplar**

**35.** Seven years ago, Varun's age was five times the square of Swati's age. Three years hence, Swati's age will be two-fifth of Varun's age. Find their present ages.

**36.** Find the roots of the equation $a^2x^2 - 3abx + 2b^2 = 0$ by the method of completing the square.

**37.** The sum of a number and its positive square root is $\frac{6}{25}$. Find the number.

**38.** The numerator of a fraction is 3 less than its denominator. If 1 is added to the denominator, the fraction is decreased by $\frac{1}{15}$. Find the fraction.

**39.** Three consecutive natural numbers are such that the square of the middle number exceeds the difference of the squares of other two by 60. Find the numbers.
**CBSE 2016**

**40.** **HOTS** Solve for x: $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$, where $a, b, x \neq 0$ and $a + b + x \neq 0$

**41.** **HOTS** If the roots of the equation $x^2 + 2cx + ab = 0$ are real and unequal, then prove that the equation $x^2 - 2(a+b)x + a^2 + b^2 + 2c^2 = 0$ has no real roots.

## Long Answer (LA) Type Questions

**[4 Marks each]**

**42.** Solve for x:
$\frac{1}{(x-1)(x-2)} + \frac{1}{(x-2)(x-3)} = \frac{2}{3}$; $x \neq 1, 2, 3$
**CBSE 2016**

**43.** Solve for x:
$\frac{1}{x+1} + \frac{2}{x+2} = \frac{4}{x+4}$, $x \neq -1, -2, -4$
**CBSE 2016**

EXAM PRACTICE

**44.** Solve for x:

$$\frac{x-4}{x-5}+\frac{x-6}{x-7}=\frac{10}{3}, x \neq 5, 7$$

**CBSE 2014**

**45.** Find the roots of $5^{(x+1)}+5^{(2-x)}=5^3+1$ by factorisation method.

**46.** If $x=-2$ is a root of the equation $3x^2+7x+p=0$. Find the values of $k$, so that the roots of the equation $x^2+k(4x+k-1)+p=0$ are equal.

**CBSE 2015**

**47.** If $x=-5$ is a root of the quadratic equation $2x^2+px-15=0$ and the quadratic equation $p(x^2+x)+k=0$ has equal roots, then find the value of $k$. **CBSE 2016**

**48.** Solve the quadratic equation $9x^2-15x+6=0$ by method of completing the square. **CBSE 2012**

**49.** A piece of cloth costs ₹ 200. If the piece was 5 m longer and each metre of cloth costs ₹ 2 less, the cost of the piece would have remained unchanged. How long is the piece and what is the original rate per metre? **CBSE 2015**

**50.** ₹ 6500 were divided equally among a certain number of persons. If there had been 15 more persons, each would have got ₹ 30 less. Find the original number of persons. **CBSE 2013, 12**

**51.** A shopkeeper buys a number of books for ₹ 1200. If he had bought 10 more books for the same amount, each book would have cost him ₹ 20 less. How many books did he buy? **CBSE 2012**

**52.** If the equation $(1+m^2)x^2+(2mc)x+(c^2-a^2)=0$ has equal roots, then prove that $c^2=a^2(1+m^2)$.

**53.** A train takes 2 h less for a journey of 300 km, if its speed is increased by 5 km/h from its usual speed. Find the usual speed of the train. **CBSE 2012**

**54.** A motor boat whose speed is 24 km/h in still water takes 1 h more to go 32 km upstream than to return downstream to the same spot. Find the speed of the stream. **CBSE 2016**

**55.** Two pipes running together can fill a cistern in $11\frac{1}{9}$ min. If one pipe takes 5 min more than the other to fill it. Find the time in which each pipe would fill the cistern. **CBSE 2016**

**56.** A factory kept increasing its output by the same percentage every year. Find the percentage, if it is known that the output doubles in the last two years. **CBSE 2015, 13**

**57.** Solve $x=\dfrac{1}{2-\dfrac{1}{2-\dfrac{1}{2-x}}}$; $x \neq 2$.

**58.** If the roots of the equation $(a-b)x^2+(b-c)x+(c-a)=0$ are equal, then prove that $2a=b+c$. **CBSE 2015**

**59.** **HOTS** There is a square field whose side is 44 m. A square flower bed is prepared in its centre leaving a gravel path all round the flower bed. The total cost of laying the flower bed and gravelling the path at ₹ 2.75 and ₹ 1.50 per $m^2$ respectively, is ₹ 4904. Find the width of gravel path.

Chapter - 14

# Exam Practice

Statistics

## Very Short Answer (VSA) Type Questions

[1 Mark each]

1. If $u_i = \frac{x_i - 20}{10}$, $\Sigma f_i u_i = 30$ and $\Sigma f_i = 40$, then find the value of $\bar{x}$.

2. If $u_i = \frac{x_i - 25}{10}$, $\Sigma f_i u_i = 20$ and $\Sigma f_i = 100$, then find the value of $\bar{x}$.

3. If the mean of the following distribution is 6, then find the value of $a$.

| $x_i$ | 2 | 4 | 6 | 10 | $a + 5$ |
|---|---|---|---|---|---|
| $f_i$ | 3 | 2 | 3 | 1 | 2 |

4. If the mean of the following distribution is 2.6, then find the value of $y$.

| Variable | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Frequency | 4 | 5 | $y$ | 1 | 2 |

5. In the following distribution, find the number of families having income range 16000-19000 (in ₹).

| Monthly income range (in ₹) | Number of families |
|---|---|
| Income more than ₹ 10000 | 100 |
| Income more than ₹ 13000 | 85 |
| Income more than ₹ 16000 | 69 |
| Income more than ₹ 19000 | 50 |
| Income more than ₹ 22000 | 33 |
| Income more than ₹ 25000 | 15 |

**NCERT Exemplar**

6. For the following distribution, then find the modal class. **NCERT Exemplar**

| Marks | Number of students |
|---|---|
| Below 10 | 3 |
| Below 20 | 12 |
| Below 30 | 27 |
| Below 40 | 57 |
| Below 50 | 75 |
| Below 60 | 80 |

7. In an arranged series of $4n$ terms, which term is median?

8. Given below is a cumulative frequency distribution of 'less than type':

| Marks obtained | Less than 20 | Less than 30 | Less than 40 | Less than 50 |
|---|---|---|---|---|
| Number of students (Cumulative frequency) | 8 | 13 | 19 | 24 |

Change the above data into a continuous grouped frequency distribution. **CBSE 2016**

9. Write the empirical relationship between the three measures of central tendency.

10. Find the mode of the data, using an empirical formula, when it is given that median = 41.25 and mean = 33.75. **CBSE 2016**

11. If mode = 80 and mean = 110, then find the median. **CBSE 2010**

12. The abscissa of the point of intersection of the less than type and more than type cumulative frequency curves of a grouped data gives which measure of central tendency? **NCERT Exemplar**

13. **HOTS** If $x_i$'s are the mid-points of the class intervals of grouped data, $f_i$'s are corresponding frequencies and $\bar{x}$ is the mean, then find the value of $\Sigma(f_i x_i - \bar{x})$. **NCERT Exemplar**

14. **HOTS** The time (in seconds) taken by 150 athletes to run a 110 $m$ hurdle race are tabulated below:

| Class interval | Frequency |
|---|---|
| 13.8-14.0 | 2 |
| 14.0-14.2 | 4 |
| 14.2-14.4 | 5 |
| 14.4-14.6 | 71 |
| 14.6-14.8 | 48 |
| 14.8-15.0 | 20 |

Find the number of athletes, completed the race in less than 14.6 $s$. **NCERT Exem**

EXAM PRACTICE

## Short Answer (SA) Type I Questions

[2 Marks each]

**15.** Karan scored 36 marks in English, 44 marks in Hindi, 75 marks in Mathematics and $x$ marks in Science. If he has scored an average of 50 marks, then find the value of $x$.

**16.** Find the value of $k$ for the following distribution whose mean is 16.6.

| $x_i$ | 8 | 12 | 15 | $k$ | 20 | 25 | 30 |
|---|---|---|---|---|---|---|---|
| $f_i$ | 12 | 16 | 20 | 24 | 16 | 8 | 4 |

**17.** If the mean of the following data is 18.75, then find the value of $p$.

| $x_i$ | 10 | 15 | $p$ | 25 | 30 |
|---|---|---|---|---|---|
| $f_i$ | 5 | 10 | 7 | 8 | 2 |

**CBSE 2005**

**18.** In the following distribution, if mean of the distribution is 86, then find the value of $p$.

| Wages (in ₹) | 50-60 | 60-70 | 70-80 | 80-90 | 90-100 | 100-110 |
|---|---|---|---|---|---|---|
| Number of workers | 5 | 3 | 4 | $p$ | 2 | 13 |

**19.** Find $p$, if the mean of the given data is 15.45.

| Class interval | 0-6 | 6-12 | 12-18 | 18-24 | 24-30 |
|---|---|---|---|---|---|
| Frequency | 6 | 8 | $p$ | 9 | 7 |

**CBSE 2011**

**20.** The following table gives the literacy rate (in %) in 40 cities. Find the mean of literacy rate.

| Literacy rate (in %) | 45-55 | 55-65 | 65-75 | 75-85 | 85-95 |
|---|---|---|---|---|---|
| Number of cities | 4 | 11 | 12 | 9 | 4 |

**CBSE 2014**

**21.** The weight (in kg) of 50 wrestlers are recorded in the following table:

| Weight (in kg) | 100-110 | 110-120 | 120-130 | 130-140 | 140-150 |
|---|---|---|---|---|---|
| Number of wrestlers | 4 | 14 | 21 | 8 | 3 |

Find the mean weight of the wrestlers.

**NCERT Exemplar**

**22.** The following table gives the number of pages written by Sarika for completing her own book for 30 days:

| Number of pages written per day | 16-18 | 19-21 | 22-24 | 25-27 | 28-30 |
|---|---|---|---|---|---|
| Number of days | 1 | 3 | 4 | 9 | 13 |

Find the mean number of pages written per day.

**NCERT Exemplar**

**23.** Find the mode of the following data.

| Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 |
|---|---|---|---|---|---|
| Number of students | 3 | 12 | 32 | 20 | 6 |

**24.** Calculate mode of the following data.

| Marks obtained | 0-20 | 20-40 | 40-60 | 60-80 | 80-100 |
|---|---|---|---|---|---|
| Number of students | 8 | 10 | 12 | 6 | 3 |

**CBSE 2011**

**25.** Find the mode of the given data.

| Class interval | 3-6 | 6-9 | 9-12 | 12-15 | 15-18 | 18-21 | 21-24 |
|---|---|---|---|---|---|---|---|
| Frequency | 2 | 5 | 10 | 23 | 21 | 12 | 3 |

**CBSE 2010**

**26.** Convert the following data into a 'more than type' distribution.

| Class interval | 50-55 | 55-60 | 60-65 | 65-70 | 70-75 | 75-80 |
|---|---|---|---|---|---|---|
| Frequency | 2 | 8 | 12 | 24 | 38 | 16 |

**CBSE 2012**

**27.** The following is the distribution of weights (in kg) of 40 persons:

| Weight (in kg) | 40-45 | 45-50 | 50-55 | 55-60 | 60-65 | 65-70 | 70-75 | 75-80 |
|---|---|---|---|---|---|---|---|---|
| Number of persons | 4 | 4 | 13 | 5 | 6 | 5 | 2 | 1 |

Construct a cumulative frequency distribution (of the 'less than type') table for the data above.

**NCERT Exemplar**

**28.** Construct the frequency distribution table for the given data.

| Marks | Number of students |
|---|---|
| Less than 10 | 14 |
| Less than 20 | 22 |
| Less than 30 | 37 |
| Less than 40 | 58 |
| Less than 50 | 67 |
| Less than 60 | 75 |

**CBSE 2012, 11, 10**

EXAM PRACTICE

**29.** Convert the given cumulative frequency table into a frequency distribution table.

| Marks | Number of students |
|---|---|
| 0 and above | 120 |
| 20 and above | 108 |
| 40 and above | 90 |
| 60 and above | 75 |
| 80 and above | 50 |
| 100 and above | 24 |
| 120 and above | 9 |
| 140 and above | 0 |

**CBSE 2013, 10**

**30.** Form the frequency distribution table from the following data.

| Marks (Out of 90) | Number of candidates |
|---|---|
| More than or equal to 80 | 4 |
| More than or equal to 70 | 6 |
| More than or equal to 60 | 11 |
| More than or equal to 50 | 17 |
| More than or equal to 40 | 23 |
| More than or equal to 30 | 27 |
| More than or equal to 20 | 30 |
| More than or equal to 10 | 32 |
| More than or equal to 0 | 34 |

**NCERT Exemplar**

**31.** In the following frequency distribution table, find the missing values.

| Class interval | 0-8 | 8-16 | 16-24 | 24-32 | 32-40 | 40-48 |
|---|---|---|---|---|---|---|
| Frequency | 15 | $f_1$ | $f_2$ | 18 | 9 | $f_3$ |
| Cumulative frequency | 15 | 28 | 43 | 61 | $f_4$ | 80 |

**32.** Consider the following data:

| Class interval | 65-85 | 85-105 | 105-125 | 125-145 | 145-165 | 165-185 | 185-205 |
|---|---|---|---|---|---|---|---|
| Frequency | 4 | 5 | 13 | 20 | 14 | 7 | 4 |

Find the difference of the upper limit of the median class and the lower limit of the modal class. **NCERT Exemplar**

**33.** In a class test, 50 students obtained marks as follows.

| Marks obtained | 0-20 | 20-40 | 40-60 | 60-80 | 80-100 |
|---|---|---|---|---|---|
| Number of students | 4 | 6 | 25 | 10 | 5 |

Find the modal class and the median class.
**CBSE 2016**

**34.** Find the median of the following data.

| Class interval | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | Total |
|---|---|---|---|---|---|---|
| Frequency | 8 | 16 | 36 | 34 | 6 | 100 |

**CBSE 2014**

**35.** The ages of employees in a factory are as follows:

| Age (in years) | 17-23 | 23-29 | 29-35 | 35-41 | 41-47 | 47-53 |
|---|---|---|---|---|---|---|
| Number of employees | 2 | 5 | 6 | 4 | 2 | 1 |

Find the median age of the employees.

**CBSE 2012**

**36.** HOTS In the following data, find the values $p$ and $q$. Also, find the median class and modal class.

| Class interval | 100-200 | 200-300 | 300-400 | 400-500 | 500-600 | 600-700 |
|---|---|---|---|---|---|---|
| Frequency | 11 | 12 | 10 | $q$ | 20 | 14 |
| Cumulative frequency | 11 | $p$ | 33 | 46 | 66 | 80 |

**CBSE 201**

EXAM PRACTICE

## Short Answer (SA) Type II Questions [3 Marks each]

**37.** An aircraft has 120 passenger seats. The number of seats occupied during 100 flights is given in the following table:

| Number of seats | 100-104 | 104-108 | 108-112 | 112-116 | 116-120 |
|---|---|---|---|---|---|
| Frequency | 15 | 20 | 32 | 18 | 15 |

Determine the mean number of seats occupied over the flights. **NCERT Exemplar**

**38.** The daily income of a sample of 50 employees are tabulated as follows:

| Income (in ₹) | 1-200 | 201-400 | 401-600 | 601-800 |
|---|---|---|---|---|
| Number of employees | 14 | 15 | 14 | 7 |

Find the mean daily income of employees. **NCERT Exemplar**

**39.** Using step deviation method, then find the mean of the following data.

| Class interval | Frequency |
|---|---|
| 135-140 | 4 |
| 140-145 | 9 |
| 145-150 | 18 |
| 150-155 | 28 |
| 155-160 | 24 |
| 160-165 | 10 |
| 165-170 | 5 |
| 170-175 | 2 |

**CBSE 2012**

**40.** The mean of the following distribution is 132 and sum of frequencies is 50. Find the values of $x$ and $y$

| Class interval | 0-40 | 40-80 | 80-120 | 120-160 | 160-200 | 200-240 |
|---|---|---|---|---|---|---|
| Frequency | 4 | 7 | $x$ | 12 | $y$ | 9 |

**41.** The mode of a distribution is 55 and the modal class is 45-60 and the frequency preceding the modal class is 5 and the frequency after the modal class is 10. Find the frequency of the modal class.

**42.** Find the mode of the following distribution.

| Class interval | 0-20 | 20-40 | 40-60 | 60-80 | 80-100 |
|---|---|---|---|---|---|
| Frequency | 25 | 16 | 28 | 20 | 5 |

**43.** If the mode of the following frequency distribution is 31, then find the value of $p$.

| Class | 5-15 | 15-25 | 25-35 | 35-45 | 45-55 |
|---|---|---|---|---|---|
| Frequency | 3 | $p$ | 15 | 11 | 6 |

**CBSE 2011**

**44.** If mode of the following data is 45, then find the values of x and y, given $\Sigma f_i = 50$.

| Class interval | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 |
|---|---|---|---|---|---|---|---|
| Frequency | 4 | 8 | $x$ | 12 | 10 | 4 | $y$ |

**45.** Find the median of the following data.

| Class interval | 0-20 | 20-40 | 40-60 | 60-80 | 80-100 | 100-120 |
|---|---|---|---|---|---|---|
| Frequency | 7 | 8 | 12 | 10 | 8 | 5 |

**46.** The following data is the distribution of student's height of a certain class in a certain city:

| Height (in cm) | 160-162 | 163-165 | 166-168 | 169-171 | 172-174 |
|---|---|---|---|---|---|
| Number of students | 15 | 118 | 142 | 127 | 18 |

Find the median height.

**47.** Find the mean of the following data and hence find the mode, given that median of the data is 42.5.

| Class interval | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 |
|---|---|---|---|---|---|---|---|
| Frequency | 4 | 8 | 10 | 12 | 10 | 4 | 2 |

**CBSE 2011**

**48.** Compute the median for the following data.

| Class interval (Less than) | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|
| Cumulative frequency | 0 | 4 | 16 | 30 | 46 | 66 | 82 | 92 | 100 |

**CBSE 2012**

**49.** The marks scored by 750 students in an examination are given in the form of a frequency distribution table:

| Marks | Number of students |
|---|---|
| 600-640 | 16 |
| 640-680 | 45 |
| 680-720 | 156 |
| 720-760 | 284 |

EXAM PRACTICE

| Marks | Number of students |
|---|---|
| 760-800 | 172 |
| 800-840 | 59 |
| 840-880 | 18 |

Prepare a cumulative frequency table of less than type and draw an ogive.

**50.** Construct a less than type ogive from the following distribution

| Class interval | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 |
|---|---|---|---|---|---|---|---|
| Frequency | 18 | 22 | 27 | 25 | 36 | 20 | 19 |

**51.** The following table gives production yield per hectare of wheat of 100 farms of a village:

| Production yield (in kg/hec) | Number of farms |
|---|---|
| 40-45 | 4 |
| 45-50 | 6 |
| 50-55 | 16 |
| 55-60 | 20 |
| 60-65 | 30 |
| 65-70 | 24 |

Change the distribution to a 'more than type' distribution and draw its ogive.

**52.** **HOTS** Find the value of $k$, if the mean of the following distribution is 20.

| $x$ | 15 | 17 | 19 | $20 + k$ | 23 |
|---|---|---|---|---|---|
| $f$ | 2 | 3 | 4 | $5k$ | 6 |

**53.** **HOTS** Find the unknown entries $m, n, o, p, q$ and $r$ in the following distribution of heights of students in a class and the total number of students is 50.

| Height (in cm) | 150-155 | 155-160 | 160-165 | 165-170 | 170-175 | 175-180 |
|---|---|---|---|---|---|---|
| Frequency | 12 | $n$ | 10 | $p$ | $q$ | 2 |
| Cumulative frequency | $m$ | 25 | $o$ | 43 | 48 | $r$ |

**54.** **HOTS** An incomplete distribution is given as follows:

| Class interval | Frequency |
|---|---|
| 0-10 | 10 |
| 10-20 | 20 |
| 20-30 | ? |
| 30-40 | 40 |
| 40-50 | ? |
| 50-60 | 25 |
| 60-70 | 15 |

The median value is 35 and the sum of all the frequencies is 170. Using the median formula, fill up the missing frequencies.

**55.** **HOTS** If the median of the following frequer distribution is 46, then find the missing frequencies.

| Class interval | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | Total |
|---|---|---|---|---|---|---|---|---|
| Frequency | 12 | 30 | ? | 65 | ? | 25 | 18 | 230 |

## Long Answer (LA) Type Questions

**[4 Marks each]**

**56.** For the following distribution, calculate mean by using direct and assumed mean method.

| Class interval | 1-4 | 4-9 | 9-16 | 16-27 |
|---|---|---|---|---|
| Frequency | 6 | 12 | 26 | 20 |

**57.** If mean of the following data is 53, then find the missing frequencies.

| Ages (in years) | 0-20 | 20-40 | 40-60 | 60-80 | 80-100 | Total |
|---|---|---|---|---|---|---|
| Number of people | 15 | $f_1$ | 21 | $f_2$ | 17 | 100 |

**58.** The mean of the following frequency distribution is 62.8 and the sum of all the frequencies is 50. Compute the missing frequencies $f_1$ and $f_2$.

| Class interval | 0-20 | 20-40 | 40-60 | 60-80 | 80-100 | 100-120 |
|---|---|---|---|---|---|---|
| Frequency | 5 | $f_1$ | 10 | $f_2$ | 7 | 8 |

**59.** The mean of the following frequency distribution is 50, but the frequencies $f$ and $f_2$ in classes 20-40 and 60-8 respectively are missing. Find the missin frequencies.

| Class interval | 0-20 | 20-40 | 40-60 | 60-80 | 80-100 | Total |
|---|---|---|---|---|---|---|
| Frequency | 17 | $f_1$ | 32 | $f_2$ | 19 | 120 |

**NCERT Exempla**

**EXAM PRACTICE**

**60.** Calculate the mode from the following data.

| Monthly salary (in ₹) | Number of employees |
|---|---|
| Less than 5000 | 90 |
| Less than 10000 | 240 |
| Less than 15000 | 340 |
| Less than 20000 | 420 |
| Less than 25000 | 490 |
| Less than 30000 | 500 |

**61.** Calculate the mode of the following frequency distribution table.

| Marks | Number of students |
|---|---|
| 25 or more than 25 | 52 |
| 35 or more than 35 | 47 |
| 45 or more than 45 | 37 |
| 55 or more than 55 | 17 |
| 65 or more than 65 | 8 |
| 75 or more than 75 | 2 |
| 85 or more than 85 | 0 |

**CBSE 2010**

**62.** The median class of a frequency distribution is 125-145. The frequency and cumulative frequency of the class preceding to the median class are 20 and 22, respectively. Find the sum of the frequencies, if the median is 137 **CBSE 2011**

**63.** Compute the median from the following data.

| Mid value | 115 | 125 | 135 | 145 | 155 | 165 | 175 | 185 | 195 |
|---|---|---|---|---|---|---|---|---|---|
| Frequency | 6 | 25 | 48 | 72 | 116 | 60 | 38 | 22 | 3 |

**64.** The median of the following data is 525. Find the values of x and y.

| Class interval | Frequency |
|---|---|
| 0-100 | 2 |
| 100-200 | 5 |
| 200-300 | $x$ |
| 300-400 | 12 |
| 400-500 | 17 |
| 500-600 | 20 |
| 600-700 | $y$ |
| 700-800 | 9 |
| 800-900 | 7 |
| 900-1000 | 4 |
| Total | 100 |

**65.** The length of 40 leaves of a plant are measured correct upto the nearest millimetre and the data is as under.

| Length (in mm) | Number of leaves |
|---|---|
| 0-50 | 2 |
| 50-100 | 3 |
| 100-150 | 5 |
| 150-200 | 6 |
| 200-250 | 5 |
| 250-300 | 3 |
| 300-350 | 1 |

**66.** Find the mean, median and mode of the following data.

| Class interval | Frequency |
|---|---|
| 0-50 | 2 |
| 50-100 | 3 |
| 100-150 | 5 |
| 150-200 | 6 |
| 200-250 | 5 |
| 250-300 | 3 |
| 300-350 | 1 |

**67.** Find the mean, mode and median of the following data.

| Class interval | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 |
|---|---|---|---|---|---|---|---|
| Frequency | 5 | 10 | 18 | 30 | 20 | 12 | 5 |

**CBSE 2008**

**68.** Find the mean, median and mode of the following frequency distribution table.

| Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | Total |
|---|---|---|---|---|---|---|
| Number of students | 8 | 16 | 36 | 34 | 6 | 100 |

**CBSE 2008**

**69.** Draw 'more than ogive' for the frequency distribution and hence obtain the median.

| Class interval | 5-10 | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 |
|---|---|---|---|---|---|---|---|
| Frequency | 2 | 12 | 2 | 4 | 3 | 4 | 3 |

**CBSE 2014**

**70.** The following distribution gives the annual profit earned by 30 shops of a shopping complex:

| Profit (in ₹ lakh) | 0-5 | 5-10 | 10-15 | 15-20 | 20-25 |
|---|---|---|---|---|---|
| Number of shops | 3 | 14 | 5 | 6 | 2 |

Change the above distribution to more than type distribution and draw its ogive.

**CBSE 2010**

EXAM PRACTICE

**71.** The weights of tea in 70 packets are shown in the following table:

| Weight (in grams) | 200-201 | 201-202 | 202-203 | 203-204 | 204-205 | 205-206 |
|---|---|---|---|---|---|---|
| Number of packets | 13 | 27 | 18 | 10 | 1 | 1 |

Draw the 'less than type' and 'more than type' ogives for the data. **NCERT Exemplar**

**72.** The following table gives the height of trees:

| Height | Number of trees |
|---|---|
| Less than 7 | 26 |
| Less than 14 | 57 |
| Less than 21 | 92 |
| Less than 28 | 134 |
| Less than 35 | 216 |
| Less than 42 | 287 |
| Less than 49 | 341 |
| Less than 56 | 360 |

Draw less than ogive and more than ogive.

**73.** The annual rainfall record of a city for 66 days is given in the following table.

| Rainfall (in cm) | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
|---|---|---|---|---|---|---|
| Number of days | 22 | 10 | 8 | 15 | 5 | 6 |

Calculate the median rainfall using ogives 'more than type' and 'less than type'.
**NCERT Exemplar**

**74.** Draw 'less than ogive' and 'more than ogive' for the following distribution and hence find its median.

| Class interval | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 |
|---|---|---|---|---|---|---|---|
| Frequency | 10 | 8 | 12 | 24 | 6 | 25 | 15 |

**75.** HOTS Determine the mean of the following distribution.

| Marks | Number of students |
|---|---|
| Below 10 | 5 |
| Below 20 | 9 |
| Below 30 | 17 |
| Below 40 | 29 |
| Below 50 | 45 |
| Below 60 | 60 |
| Below 70 | 70 |
| Below 80 | 78 |
| Below 90 | 83 |
| Below 100 | 85 |

**NCERT Exemplar**

**76.** HOTS Following is the cumulative frequency distribution (of less than type) of 1000 persons each of age 20 yrs and above. Determine the mean age.

| Age (in years) | Below 30 | Below 40 | Below 50 | Below 60 | Below 70 | Below 80 |
|---|---|---|---|---|---|---|
| Number of persons | 100 | 220 | 350 | 750 | 950 | 1000 |

**NCERT Exemplar**

**77.** HOTS Find the missing frequencies and the median for the following distribution, if the mean is 1.46.

| Number of accidents | 0 | 1 | 2 | 3 | 4 | 5 | Total |
|---|---|---|---|---|---|---|---|
| Number of days (frequency) | 46 | ? | ? | 25 | 10 | 5 | 200 |