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1 CHAPTER

Real Numbers

Q.1 What is the HCF of the smallest composite number and the smallest prime number ? [*CBSE 2018*]

Q.2 Write whether $\frac{2\sqrt{45}+3\sqrt{20}}{2\sqrt{5}}$ on simplification gives an irrational or a rational number. [*CBSE 2018*]

Q.3 Using Euclid's division algorithm find the HCF of the numbers 867 and 255. [*CBSE 2018*]

Q.3 Given that $\sqrt{2}$ is irrational, prove that $(5 + 3\sqrt{2})$ is an irrational number. [*CBSE 2018*]

Q.5 Find HCF and LCM of 404 and 96 and verify that HCF×LCM = Product of the two given numbers. [*CBSE 2018*]

Q.6 The HCF of two numbers a and b is 5 and their LCM is 200. Find the product ab. [*CBSE 2019*]

Q.7 If HCF (336,54) = 6. Find LCM (336,54). [*CBSE 2019*]

Q.8 Find after how many places the decimal form of the number $\frac{27}{2^3.5^4.3^2}$ will terminate ? [*CBSE 2019*]

Q.9 Write a rational number between $\sqrt{2}$ and $\sqrt{3}$. [*CBSE 2019*]

Q.10 Express 429 as product of its prime factors. [*CBSE 2019*]

Q.11 Find the HCF of 612 and 1314 using prime factorisation. [*CBSE 2019*]

Q.12 Find the HCF of 1260 and 7344 using Euclide's algorithm. [*CBSE 2019*]

Or

Use Euclid's division algorithm to find the HCF of 255 and 867. [*CBSE 2019*]

Q.13 If HCF of 65 and 117 is expressible in the form 65n – 117, find the value of n. [*CBSE 2019*]

Q.14 Show that any positive odd integer is of the form 6q + 1 or 6q + 3 or 6q + 5, where q is some integer. [*CBSE 2019*]

Q.15 Write the smallest number which is divisible by both 306 and 657. [*CBSE 2019*]

Q.16 Use Euclid's division algorithm to find the HCF of

(i) 960 and 432

(ii) 4052 and 12576 [*CBSE 2019*]

Q.17 Prove that $\sqrt{5}$ is an irrational number. [*CBSE 2019*]

Q.18 Find the largest number which on dividing 1251, 9377 and 15628 leaves remainders 1, 2 and 3 respectively. [*CBSE 2019*]

Q.19 Find the rational number between $\sqrt{2}$ and $\sqrt{7}$. [*CBSE 2019*]

Q.20 Write the number of zeros in the end of a number whose prime factorization is $2^2 \times 5^3 \times 3^2 \times 17$ [*CBSE 2019*]

Q.21 The LCM of two number is 9 times their HCF. The sum of LCM and HCF is 500. Find the HCF of two numbers. [*CBSE 2019*]

Q.22 On a morning walk, three persons step out together and their steps measure 30 cm, 36 cm and 40 cm respectively. What is the minimum distance each should walk so that each can cover the same distance in complete steps ? [*CBSE 2019*]

Q.23 Prove that $n^2 + n$ is divisible by 2 for any positive integer n. [*CBSE 2019*]

Q.24 Prove that $2 + 5\sqrt{3}$ is an irrational number, given that $\sqrt{3}$ is an irrational number. [*CBSE 2019*]

Q.25 Prove that $\sqrt{3}$ is an irrational number. [*CBSE 2019*]

Q.26 Prove that $2 + 3\sqrt{3}$ is an irrational number when it is given that $\sqrt{3}$ is an irrational number. [*CBSE 2019*]

Q.27 Use Euclid's algorithm to find the HCF of 4052 and 12576. [*CBSE 2019*]

Q.28 Prove that $\sqrt{2}$ is an irrational number. [*CBSE 2019*]

Q.29 Using Euclid's division algorithm, find HCF of 2048 and 960. [*CBSE 2019*]

Q.30 Show that $\sqrt{2} + \frac{3}{\sqrt{2}}$ is an irrational number. [*CBSE 2019*]

Q.31 Show that 12^n cannot end with the digit 0 for any natural number n. [*CBSE 2020*]

Q.32 The total number of factors of a prime number is
(a) 1 (b) 0
(c) 2 (d) 3 [*CBSE 2020*]

Q.33 The HCF and the LCM of 12, 21, 15 respectively are
(a) 3,140 (b) 12,420
(c) 3,420 (d) 420,3 [*CBSE 2020*]

Q.34 If the mean of the first n natural number is 15, then find n. [*CBSE 2020*]

Q.35 Show that the square of any positive integer cannot be of the form $(5q + 2)$ or $(5q + 3)$ for any integer q. [*CBSE 2020*]

Q.36 Prove that one of every three consecutive positive integers is divisible by 3. [*CBSE 2020*]

2 CHAPTER Polynomials

Q.1 Obtain all zeros of $3x^4 - 15x^3 + 13x^2 + 25x - 30$ if two of its zeros are $\sqrt{\frac{5}{3}}$ and $-\sqrt{\frac{5}{3}}$. [*CBSE 2018*]

Q.2 Find all zeros of the polynomial $(2x^4 - 9x^3 + 5x^2 + 3x - 1)$ if two of its zeros are $(2 + \sqrt{3})$ and $(2 - \sqrt{3})$. [*CBSE 2018*]

Q.3 Find the quadratic polynomial sum and product of whose zeros are –1 and –2 respectively. Also find the zeros of the polynominal so obtained. [*CBSE 2019*]

Q.4 Find the zeros of the quadratic polynomial $7y^2 - \frac{11}{3}y - \frac{2}{3}$ and verify the relationship between zeros and the cofficients. [*CBSE 2019*]

Q.5 If α and β are the zeros of the quadratic polynomial $f(x) = x^2 - 4x + 3$, find the value of $\alpha^4\beta^2 + \alpha^2\beta^4$. [*CBSE 2019*]

Q.6 Find the value k such that the polynomial $x^2 - (k + 6)x + 2(2k - 1)$ has sum of its zeros equal to half of their product. [*CBSE 2019*]

Q.7 Check whether $g(x)$ is a factor of $p(x)$ by dividing polynomial $p(x)$ by polynomial $g(x)$,
where $p(x) = x^5 - 4x^3 + x^2 + 3x + 1$, $g(x) = x^3 - 3x + 1$. [CBSE 2019]

Q.8 Find all the zeros of the polynomial $x^4 + x^3 - 14x^2 - 2x + 24$ if two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$. [CBSE 2019]

Q.9 Apply division algorithm to check if $g(x) = x^2 - 3x + 2$ is a factor of polynomial $f(x) = x^4 - 2x^3 - x + 2$. [CBSE 2019]

Q.10 Find all the zeroies of $2x^4 - 13x^3 + 19x^2 + 7x - 3$, if you know that two if its zeroes are $2 + \sqrt{3}$ and $2 - \sqrt{3}$. [CBSE 2019]

Q.11 If 4 is a zero of the cubic polynomial $x^3 - 3x^2 - 10x + 24$, find its other two zeroes. [CBSE 2020]

3 CHAPTER — Pair of Linear Equations in Two Variables

Q.1 If $x = a$, $y = b$ is the solution of the pair of equations $x - y = 2$ and $x + y = 4$, find the value of a and b. [CBSE 2018]

Q.2 Find c if the system of equations
$cx + 3y + (3 - c) = 0$; $12x + cy - c = 0$ has infinitely many solutions. [CBSE 2019]

Q.3 Find the value (s) of k so that the pair of equations
$x + 2y = 5$ and $3x + ky + 15 = 0$ has a unique solution. [CBSE 2019]

Q.4 Solve the following pair of linear equations.
$3x + 4y = 10$ and $2x - 2y = 2$ [CBSE 2019]

Q.5 The larger of two supplementary angles exceeds the smaller by 18°. Find the angles. [CBSE 2019]

Q.6 A father's age is three times the sum of the ages of his two children. After 5 years his age will be two times the sum of their ages. Find the present age of father. [CBSE 2019]

Q.7 A fraction becomes $\frac{1}{3}$ when 2 is subtracted from the numerator and it becomes $\frac{1}{2}$ when 1 is subtracted from its denominator. Find the fraction. [CBSE 2019]

Q.8 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 of the boat in still water. [CBSE 2019]

Q.9 Find thee value of k for which the following pair of linear equations have infinitely many solutions.
$2x + 3y = 7$, $(k + 1)x + (2k - 1)y = 4k + 1$ [CBSE 2019]

Q.10 Find the value(s) of k so that the pair of equations
$x + 2y = 5$ and $3x + ky + 15 = 0$ has a unique solutions. [CBSE 2019]

Q.11 For what value of k, will the following pair of equations have infinitely many solutions ?
$2x + 3y = 7$ and $(k + 2)x - 3(1 - k)y = 5k + 1$ [CBSE 2019]

Q.12 Sumit is 3 times as old as his son. Five years later, he shall be two and a half time as old as his son. How old is sumit at present ? [CBSE 2019]

Q.13 Solve the following pair of linear equations as :
$3x - 5y = 4$
$2y + 7 = 9x$ [CBSE 2019]

Q.14 Find the solution of the pair of equations

$$\frac{3}{x} + \frac{8}{y} = -1, \quad \frac{1}{x} - \frac{2}{y} = 2, x, y \neq 0$$ [CBSE 2019]

Q.15 Find the value(s) of k for which the pair of equations

$$\begin{cases} kx + 2y = 3 \\ 3x + 6y = 10 \end{cases}$$ has unique solution. [CBSE 2019]

Q.16 For what value of k, does the system of linear equations $2x + 3y = 7$ and $(k-1)x + (k+2)y = 3k$ have an infinite number of solution ? [*CBSE 2019*]

Q.17 Find the relation between p and q if $x = 3$ and $y = 1$ is the solution of the pair of equations

$x - 4y + p = 0$ and $2x + y - q - 2 = 0$. [*CBSE 2019*]

Q.18 Draw the graph of the equations $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Using this graph, find the values of x and y which satisfy both the equations. [*CBSE 2019*]

Q.19 Solve the following pair of linear equations :

$3x + 4y = 10$

$2x - 2y = 2$ [*CBSE 2019*]

Or

Find the value of α and β for for which the following pair of linear equation has infinite number of solution:

$2x + 3y = 7$

$2\alpha x + (\alpha + \beta)y = 28$

Q.20 The value of k for which the system of equations $x + y - 4 = 0$ and $2x + ky = 3$, has no solution, is

(a) -2 (b) $\neq 2$

(c) 3 (d) 2 [*CBSE 2020*]

4 CHAPTER — Quadratic Equations

Q.1 Solve the quadratic equation $2x^2 + ax - a^2 = 0$ for x. [*CBSE 2014*]

Q.2 Solve for $x: 2\left(\frac{2x-1}{x+3}\right) - 3\left(\frac{x+3}{2x-1}\right) = 5; x \neq -3, \frac{1}{2}$ [*CBSE 2014*]

Q.3 Find the value of p for which the quadratic equation $(2p+1)x^2 - (7p+2)x + (7p-3) = 0$ has equal roots. Also find these roots. [*CBSE 2014*]

Q.4 The difference of two natural numbers is 5 and the difference of their reciprocals is $\frac{1}{10}$. Find the numbers. [*CBSE 2014*]

Q.5 The sum of the squares of two consecutive odd numbers is 394. Find the numbers.[*CBSE 2014,2017*]

Q.6 The sum of the squares of two consecutive multiples of 7 is 637. Find the multiples. [*CBSE 2014*]

Q.7 Solve for $x: \frac{14}{x+3} - 1 = \frac{5}{x+1}$ $x = -3, -1$ [*CBSE 2014*]

Q.8 Solve for $x: \frac{3}{x+1} - \frac{1}{2} = \frac{2}{3x-1}$; $x \neq 1$, $x \neq \frac{1}{3}$ [*CBSE 2014*]

Q.9 If 2 is a root of the quadratic equation $3x^2 + px - 8 = 0$ and the quadratic equation $4x^2 - 2px + k = 0$ has equal roots, find the value of k. [*CBSE 2014*]

Q.10 Solve for x : $\frac{x-3}{x-4} + \frac{x-5}{x-6} = \frac{10}{3}; x \neq 4, 6$ [*CBSE(Al) 2014*]

Q.11 Solve for x : $\frac{x-2}{x-3} + \frac{x-4}{x-5} = \frac{10}{3}; x \neq 3, 5$ [*CBSE(Al) 2014*]

Q.12 The sum of the squares of two consecutive even numbers is 340. Find the numbers. [*CBSE 2014*]

Q.13 The difference of two natural numbers is 5 and the difference of their reciprocals is $\frac{5}{14}$. Find the numbers. [*CBSE 2014*]

Q.14 The difference of two natural numbers is 3 and the difference of their reciprocals is $\frac{3}{28}$. Find the numbers. [*CBSE 2014*]

Q.15 Sovle for x : $3\left(\frac{3x-1}{2x+3}\right)-2\left(\frac{2x+3}{3x-1}\right)=5x\neq\frac{1}{3},-\frac{3}{2}$ [*CBSE 2014*]

Q.16 If -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 2014, 2016*]

Q.17 Solve for x : $x^2 + 5x - (a^2 + a - 6) = 0$ [*CBSE 2015*]

Q.18 Find the non-zero value of k, for which the quadratic equation $kx^2 + 1 - 2(k - 1)x + x^2 = 0$ has equal roots. Hence find the roots of the equation. [*CBSE 2015*]

Q.19 Solve for x : $\frac{2}{x+1}+\frac{3}{2(x-2)}=\frac{23}{5x}, x\neq 0,-1,2$ [*CBSE 2015*]

Q.20 Solve for x : $\frac{3}{x+1}+\frac{4}{x-1}=\frac{29}{4x-1}; x\neq 1,-1,\frac{1}{4}$ [*CBSE 2015*]

Q.21 If $x = \frac{2}{3}$ and $x = -3$ are roots of the quadratic equation $ax^2 + 7x + b = 0$, find the values of a and b. [*CBSE 2016*]

Q.22 A two digit number is four times the sum of the digits. It is also equal to 3 times the product of digits. Find the number. [*CBSE 2016*]

Q.23 Sovle for : $x:\frac{1}{(x-1)(x-2)}+\frac{1}{(x-2)(x-3)}=\frac{2}{3}$, $x\neq 1,2,3$ [*CBSE(Al) 2016*]

Q.24 Solve for $x:\frac{1}{x+1}+\frac{2}{x+2}=\frac{4}{x+4}, x\neq -1,-2,-4.$ [*CBSE(Al) 2016*]

Q.25 Find the positive value (s) of k for which both quadratic equations $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ will have real roots. [*CBSE 2016*]

Q.26 Solve the following quadratic equation :
$9x^2 - 9(a + b)x + [2a^2 + 5ab + 2b^2] = 0$ [*CBSE 2016*]

Q.27 Find x in terms of a, b and c :
$\frac{a}{x-a}+\frac{b}{x-b}=\frac{2c}{x-c}, x\neq a,b,c$ [*CBSE 2016*]

Q.28 Two water taps together can fill a tank in 9 hours 36 minutes. The tap of larger diameter takes 8 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank. [*CBSE 2016*]

Q.29 A motorboat whose speed is 24 km/h in still water takes 1 hour more to go 32 km upstream than to return downstream to the same spot. Find the speed of the stream. [*CBSE(Al) 2016*]

Q.30 Find the value of k for which the equation $x^2 + k(2x + k - 1) + 2 = 0$ has real and equal roots. [*CBSE 2017*]

Q.31 Find the roots of the quadratic equation
$\sqrt{2}x^2+7x+5\sqrt{2}=0$ [*CBSE 2017*]

Q.32 Find the value of p, for which one root of the quadratic equation $px^2 - 14x + 8 = 0$ is 6 times of other. [*CBSE(Al)2017*]

Q.33 If $ad \neq bc$, then prove that the equation $(a^2 + b^2)x^2 + 2(ac + bd)x + (c^2 + d^2) = 0$ has no real roots. [*CBSE 2017*]

Q.34 If the roots of the quadratic equation $(a - b)x^2 + (b - c)x + (c - a) = 0$ are equal, prove that $2a = b + c$. [*CBSE 2017*]

Q.35 If the equation $(1 + m^2)x^2 + 2mcx + c^2 - a^2 = 0$ has equal roots, show that $c^2 = a^2(1 + m^2)$. [*CBSE 2017*]

Q.36 If the roots of the 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 $a^3 + b^3 + c^3 = 3abc$. [*CBSE(Al) 2017*]

Q.37 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 $a = b = c$. [*CBSE 2017*]

Q.38 A train covers a distance of 300 km at a uniform speed. If the speed of the train is increased by 5 km/hour, it takes 2 hours less in the journey. Find the original speed of the train. [*CBSE (Al)2017*]

Q.39 Speed of a boat in still water is 15 km/h. It goes 30 km upstream and returns back at the same point in 4 hours 30 minutes. Find the speed of the stream. [*CBSE 2017*]

Q.40 Ram takes 6 days less than Bhagat to finish a piece of

work. If both of them together can finish the work in 4 days, in how many days Bhagat alone can finish the work. [CBSE 2017]

Q.41 Two taps running together can fill a tank in $3\frac{1}{13}$ hours. If one tap takes 3 hours more than the other to fill the tank, then how much time will each tap take to fill the tank ? [CBSE (Al)2017]

Q.42 In a rectangular park of dimensions 50 m × 40m, a rectangular pond is constructed so that the area of grass strip of uniform width surrounding the pond would be 1184 m^2. Find the length and breadth of the pond. [CBSE 2017]

Q.43 If the root of the quadratic equation $6x^2 - x - k = 0$ is $\frac{2}{3}$, then find the value of k. [CBSE 2017]

Q.44 Show that if the roots of the following quadratic equation are equal, then $ad = bc$

$x^2(a^2 + b^2) + 2(ac + bd)x + (c^2 + d^2) = 0$ [CBSE 2017]

Q.45 Solve for x : $4x^2 + 4bx - (a^2 - b^2) = 0$ [CBSE 2017]

Q.46 Solve for x : $\frac{1}{x+1} + \frac{3}{5x+1} = \frac{5}{x+4}, x \neq -1, -\frac{1}{5}, -4$ [CBSE(Al) 2017]

Q.47 Solve for x : $\frac{x+3}{x-2} - \frac{1-x}{x} = \frac{17}{4}; x \neq 0, 2$ [CBSE(Al) 2017]

Q.48 Solve for x : $\frac{x+3}{x+2} = \frac{3x-7}{2x-3}, x \neq -2, \frac{3}{2}$ [CBSE 2017]

Q.49 Find the value of k such that the equation $(k-12)x^2 + 2(k-12)x + 2 = 0$ has equal roots. [CBSE 2017]

Q.50 Solve for x : $\sqrt{3}x^2 + 10x + 7\sqrt{3} = 0$ [CBSE 2017]

Q.51 Find the value of c for which the quadratic equation $4x^2 - 2(c+1)x + (c+1) = 0$ has equal roots, which are real. [CBSE 2017]

Q.52 Solve for x : $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$,

$a + b + x \neq 0$, $a, b, x \neq 0$ [CBSE 2017, 2018]

Q.53 If one root of $5x^2 + 13x + k = 0$ is the reciprocal of the other root, then find value of k. [CBSE 2018]

Q.54 If $x = 3$ is one root of the quadratic equation $x^2 - 2kx - 6 = 0$, then find the value of k. [CBSE 2018]

Q.55 A train travels at a certain average speed for a distance of 63 km and then travels at a distance of 72 km at an average speed of 6 km/h more than its original speed. If it takes 3 hours to complete total journey, what is the original average speed ? [CBSE 2018]

Q.56 A motorboat whose speed is 18 km/h in still water takes one hour more to go 24km upstream than to return downstream to the same spot. Find the speed of the stream. [CBSE 2018,2019,2020]

Q.57 A faster train takes one hour less than a slower train for a journey of 200 km. If the speed of slower train is 10 km/h less than that of faster train, find the speeds of two trains. [CBSE 2018]

Q.58 For what value of k, the roots of the equation $x^2 + 4x + k = 0$ are real ? [CBSE 2019]

Q.59 Find the value of k for which the roots of the equation $3x^2 - 10x + k = 0$ are reciprocal of each other. [CBSE 2019]

Q.60 Find the nature of roots of the quadratic equation $2x^2 - 4x + 3 = 0$ [CBSE 2019]

Q.61 Fine the nature of the roots of the quadractic equation $4x^2 + 4\sqrt{3}x + 3 = 0$. [CBSE 2019]

Q.62 For what value of k does the quadratic equation $4x^2 - 12x - k = 0$ have no real roots? [CBSE 2019]

Q.63 Find the value(s) of k for which the quadratic equation $3x^2 + kx + 3 = 0$ has real and equal roots.
+ [CBSE 2019]

Q.64 For what values of 'a' the quadratic equation $9x^2 - 3ax + 1 = 0$ has equal roots ? [CBSE 2019]

Q.65 If one root of the quadratic equation $2x^2 + 2x + k = 0$ is $-\frac{1}{3}$, find the value of k. [CBSE 2019]

Q.66 What will be the nature of roots of quadratic equation $2x^2 - 4x + 3 = 0$? [CBSE 2019]

Q.67 Find the value of k for which the quadratic equation $hx(x - 2) + 6 = 0$ has two equal roots. [CBSE 2019]

Q.68 Write the discriminant of the quadratic equation : $(x + 5)^2 = 2(5x - 3)$ [CBSE 2019]

Q.69 Find the value of k, for which $x = 2$ is a solution of the equation $kx^2 + 2x - 3 = 0$. [CBSE 2019]

Q.70 A train travels 360 km at a uniform speed. If the speed has been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train. [CBSE 2019]

Q.71 Write all the value of p for which the quadratic equation $x^2 + px + 16 = 0$ has equal roots. Find the roots of the equation so obtained. [CBSE 2019]

Q.72 Sum of the areas of two squares is 157 m^2. If the sum of their perimeters is 68 m, find the sides of the two squares. [CBSE 2019]

Q.73 Find the value of k for which the quadratic equation $(k + 1)x^2 - 6(k + 1)x + 3(k + 9) = 0$, $k \neq -1$ has equal roots. [CBSE 2019]

Q.74 Solve for x : $\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$; $x \neq 0$, $x \neq \frac{-2a-b}{2}$, $a, b \neq 0$ [CBSE 2019]

Q.75 The sum of the areas of two squares is 640 m^2. If the difference of their perimeters is 64 m, find the sides of the squares. [CBSE 2019]

Q.76 Solve for x :

$$\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}; \; a \neq b \neq 0, \; x \neq 0, x \neq -(a + b)$$

[CBSE 2019]

Q.77 Solve the following equation for x :

$$\frac{1}{x+1} + \frac{2}{x+2} = \frac{7}{x+5}, \; x \neq -1, -2, -5$$

[CBSE 2019]

Q.78 A motoroboat whose speed is 18 km/h in still water takes 1 h 30 minutes more to go 36 km upstream than to return downstream to the same spot. Find the speed of the stream. [CBSE 2019]

Q.79 Two water taps together 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. [*CBSE 2019*]

Q.80 The total cost of a certain length of a piece of cloth is ` 200. If the piece was 5 m longer and each metre of cloth costs ` 2 less, the cost of the piece would have would have remained unchanged. How long is the piece and what is its original rate per metre ? [*CBSE 2019*]

Q.81 A plane left 30 minutes later than the scheduled time and in order reach its destination 1500 km away on time, it has to increase its speed by 250 km/h from its usual speed. Find the usual speed of the plane. [*CBSE 2019*]

Q.82 Find the dimensions of a rectangular park whose perimeter is 60 m and area is 200 m^2. [*CBSE 2019*]

Q.83 If one of the zeroes of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is

(a) 10 (b) – 10

(c) –7 (d) – 2 [*CBSE 2020*]

Q.84 The quadratic polynomial, the sum of whose zeroes is – 5 and their product is 6, is

(a) $x^2 + 5x + 6$ (b) $x^2 – 5x + 6$

(c) $x^2 – 5x – 6$ (d) $–x^2 + 5x + 6$ [*CBSE 2020*]

Q.85 Find q quadratic polynomial whose zeroes are reciprocals of the zeroes of the polynomial

$f(x) = ax^2 + bx + c, a \neq 0, c \neq 0.$ [*CBSE 2020*]

Q.86 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. [*CBSE 2020*]

Q.87 A man can row a boat downstream 20 km in 2 hours and upstream 4 km in 2 hours. Find his speed of rowing in still water. Also find the speed of the stream. [*CBSE 2020*]

Q.88 A train covers a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Find the original speed of the train. [*CBSE 2020*]

5 CHAPTER

Arithmetic Progressions

Q.1 For what value of p are $2p + 1$, 13, $5p - 3$, three consecutive terms of AP ? [*CBSE 2009*]

Q.2 Find the 25th term of the AP $-5, \frac{-5}{2}, 0, \frac{5}{2}$ ..... [*CBSE 2009*]

Q.3 The first and the last term of an AP are 5 and 45 respectively. If the sum of all its terms is 400, find its common difference. [*CBSE 2014*]

Q.4 Find the number of natural numbers between 101 and 999 which are divisible by both 2 and 5. [*CBSE(Al) 2014*]

Q.5 If S_n denotes the sum of the first n terms of an AP, prove that $S_{30} = 3(S_{20} - S_{10})$. [*CBSE 2014*]

Q.6 The first and the last terms of an AP are 7 and 49 respectively. If sum of all its terms is 420, find its common difference. [*CBSE 2014*]

Q.7 The sum of the 2nd and the 7th terms of an AP is 30. If its 15th term is 1 less than twice its 8th term, find the AP. [*CBSE (Al)2014*]

Q.8 The sum of the first n terms of an AP is $4n^2 + 2n$. Find the n^{th} term of this AP. [*CBSE 2014*]

Q.9 In an AP of 50 terms, the sum of first 10 terms is 210 and the sum of its last 15 terms is 2565. Find the AP. [*CBSE 2014, 2017*]

Q.10 Find the middle term of the sequence formed by all three-digit numbers which leave a remainder 3, when divided by 4. Also find the sum of all numbers on both sides of the middle term separately. [*CBSE 2015*]

Q.11 Ramkali required ` 2500 after 12 weeks to send her daughter to school. She saved ` 100 in the first week and increased her weekly saving by ` 20 every week. Find whether she will be able to send her daughter to school after 12 weeks. [*CBSE 2015*]

Q.12 Find the middle term of the sequence formed by all numbers between 9 and 95, which leave a remainder 1 when divided by 3. Also find the sum of the numbers on both sides of the middle term separately. [*CBSE 2015*]

Q.13 An arithmetic progression 5, 12, 19, ..., has 50 terms. Find its last term. Hence find the sum of its last 15 terms. [*CBSE (Al)2015*]

Q.14 The sum of first n terms of three arithmetic progressions are S_1, S_2 and S_3 respectively. The first term of each AP is 1 and their common differences are 1, 2 and 3 respectively. Prove that $S_1 + S_3 = 2S_2$ [*CBSE 2016*]

Q.15 Find the 9th term from the end (towards the first term) of the AP 5, 9, 13, ..., 185. [*CBSE 2016*]

Q.16 How many terms of the AP 18, 16, 14 ..... be taken so that their sum is zero ? [*CBSE 2016*]

Q.17 The 4th terms of an AP is zero. Prove that the 25th term of the AP is three times its 11 th term. [*CBSE(Al) 2016*]

Q.18 If the ratio of the sum of first n terms of two AP's in $(7n + 1) : (4n + 27)$, find the ratio of their mth terms. [*CBSE (Al)2016*]

Q.19 If the ratio of sum of the first m and n terms of an AP is $m^2 : n^2$, show that the ratio of its mth and nth terms is $(2m - 1) : (2n - 1)$ [*CBSE 2016,2017*]

Q.20 If the sum of first 7 terms of an AP is 49 and that of 17 terms is 289, find the sum of first n terms. [*CBSE2016,2017*]

Q.21 Divide 56 into four parts which are in AP such that the ratio of product of extremes to the product of means is 5 : 6. [*CBSE 2016*]

Q.22 A thief runs with a uniform speed of 100 m/minute. After one minute a policeman runs after the thief to catch him. He goes with a speed of 100 m/minute in the first minute and increases his speed by 10 m/minute every succeeding minute. After how many minutes of policeman will catch the thief ? [*CBSE 2016*]

Q.23 The houses in a row are numbered consecutively from 1 to 49. Show that there exists a value of X such that sum of numbers of houses preceeding the house numbered X is equal to sum of the numbers of houses following X. Find value of X. [*CBSE(Al) 2016*]

Q.24 How many terms of the AP 27, 24, 21 ..... should be taken so that their sum is zero ? [*CBSE 2016*]

Q.25 For what value of k will the consecutive terms $2k + 1$, $3k + 3$ and $5k - 1$ form an AP ? [*CBSE 2016*]

Q.26 Write the n^{th} term of the AP $\frac{1}{m}, \frac{1+m}{m}, \frac{1+2m}{m}, ...$ [*CBSE 2016*]

Q.27 The pth, qth and rth terms of an AP are a, b and c respectively. Show that $a(q - r) + b(r - p) + c(p - q) = 0$ [*CBSE 2016*]

Q.28 Find how many integers between 200 and 500 are divisible by 8. [*CBSE 2017*]

Q.29 What is the common difference of an AP in which $a_{21} - a_7 = 84$? [*CBSE (Al)2017*]

Q.30 For what value of n, are the terms n^{th} of two APs 63,65, 67 ..... and 3, 10, 17 ..... equal ? [*CBSE (Al)2017*]

Q.31 Which term of the progression $20, 19\frac{1}{4}, 18\frac{1}{2}, 17\frac{3}{4}, ...$ its first negative term ? [*CBSE (Al)2017*]

Q.32 How many terms of the AP 9, 17, 25, ... must be taken to give a sum of 636 ? [*CBSE 2017*]

Q.33 Find the sum of the following series :
$5 + (-41) + 9 + (-39) + 13 + (-37) + 17 + ... + (-5) + 81 + (-3)$ [*CBSE 2017*]

Q.34 Find the sum of all two digit natural numbers which are divisible by 4. [*CBSE 2017*]

Q.35 If the ratio of the 11 th term of an AP to its 18th term is 2 : 3, find the ratio of the sum of the first five terms to the sum of its first 10 terms. [*CBSE 2017*]

Q.36 Find the sum of the first 15 multiples of 8 . [*CBSE 2017*]

Q.37 If the sum of m terms of an AP is the same as the sum of its n terms, show that the sum of its $(m + n)$ terms is zero. [*CBSE 2017*]

Q.38 Find whether –150 is a term of the AP 11, 8, 5, 2, ... [*CBSE 2017*]

Q.39 The 10th term of an AP is (–4) and its 22 nd term is (–16). Find its 38th term. [*CBSE 2017*]

Q.40 Which term of the AP, 8, 14, 20, 26, ... will be 72 more than its 41 st term ? [*CBSE 2017*]

Q.41 Which term of an AP is zero, prove that its 29th term is double the 19th term. [*CBSE 2017*]

Q.42 If the pth term of an AP is $\frac{1}{q}$ and qth term is $\frac{1}{p}$, prove that the sum of the pq terms is $\frac{1}{2}(pq + 1)$ [*CBSE 2017*]

Q.43 If the ratio of the sum of the first n terms of two APs is $(7n + 1) : (4n + 27)$, then find the ratio of their 9th terms. [*CBSE 2017*]

Q.44 If $1 + 4 + 7 + 10 + ... + x = 287$, find the value of x. [*CBSE 2017*]

Q.45 If m^{th} term of an AP is $\frac{1}{n}$ and n^{th} term is $\frac{1}{m}$, then find the sum of its first mn terms. [*CBSE 2017*]

Q.46 The sum of four consecutive numbers in an AP is 32 and the ratio of the product of the first and the last term to the product of two middle terms is 7 : 15. Find the numbers. [*CBSE 2018*]

Q.47 If the mth term of an AP is $\frac{1}{n}$ and nth term is $\frac{1}{m}$, then find the sum of its first (mn) terms. [*CBSE 2017,2019*]

Q.48 Find the sum of first 10 multiples of 6. [*CBSE 2019*]

Q.49 Find the common difference of the AP

$$\frac{1}{a}, \frac{3-a}{3a}, \frac{3-2a}{3a}, \ldots\ldots\ldots (a \neq 0)$$ [*CBSE 2019*]

Q.50 How many two digits numbers are divisible by 3 ? [*CBSE 2019*]

Q.51 Find the number of terms in the AP

$$18, 15\frac{1}{2}, 13\ldots\ldots, -47$$ [*CBSE 2019*]

Q.52 Which term of the AP –4, –1, 2, ... is 101 ? [*CBSE 2019*]

Q.53 If in an AP, $a = 15$, $d = -3$ and $a_n = 0$, then find the value of n. [*CBSE 2019*]

Q.54 If the n^{th} term of an AP is $pn + q$, find its common difference. [*CBSE 2019*]

Q.55 Which term of the AP 4,7,10, ... is 64 ? [*CBSE 2019*]

Q.56 Which term of the AP 10, 7,4, ...is –41 ? [*CBSE 2019*]

Q.57 If S_n, the sum of first n terms of an AP is given by $S_n = 2n^2 - 4n$, find the nth term. [*CBSE 2019*]

Q.58 How many multiples of 4 lie between 10 and 205 ? [*CBSE 2019*]

Q.59 Determine the AP whose third term is16 and 7^{th} term exceeds the 5^{th} term by 12. [*CBSE 2019*]

Q.60 Find the sum of 7 + 10 + 13 + ... + 46. [*CBSE 2019*]

Q.61 If the 9^{th} term of an AP is zero, then show that its 29^{th} term is double of its 19^{th} term. [*CBSE 2019*]

Q.62 If the sum of first four terms of an AP is 40 and that of first 14 terms is 280. Find the sum of its first n terms. [*CBSE 2019*]

Q.63 Which term of the Arithmetic Progression –7, –12, –17, –22, ... will be – 82 ? Is –100 any term of the AP? Give reason for your answer. [*CBSE 2019*]

Q.64 If m times the m^{th} term of an Anithmetic Progression is equal to n times its n^{th} term show that the $(m + n)^{th}$ term of the AP is zero. [*CBSE 2019*]

Q.65 The sum of the first three numbers in an Arithmetic Progression is 18. If the product of the first and the third term is 5 times the common difference, find the three numbers. [*CBSE 2019*]

Q.66 Find the value of x, when in the AP given below $2 + 6 + 10 + ... + x = 1800$. [*CBSE 2019*]

Q.67 In an AP,the first term is –4, the last term is 29 and the sum of all its terms is 150. Find its common difference. [*CBSE 2019*]

Q.68 Find the sum of all the two digit numbers which leave the remainder 2 when divided by 5. [*CBSE 2019*]

Q.69 Find the sum of all odd numbers between 0 and 50. [*CBSE 2019*]

Q.70 Find the sum of the integers between 100 and 200 that are : (i) divisible by 9 (ii) not divisible by 9. [*CBSE 2019*]

Q.71 Write the common difference of the

AP $\sqrt{3}, \sqrt{12}, \sqrt{27}, \sqrt{48}$, ... [*CBSE 2019*]

Q.72 If 7 times the 7^{th} term of an AP is equal to 11 times its 11^{th} term, then find its 18^{th} term. [*CBSE 2019*]

Q.73 If S_n, the sum of the first n terms of an AP is given by $S_n = 2n^2 + n$,then find its n^{th} term. [*CBSE 2019*]

Q.74 If the 17^{th} term of an AP exceeds its 10^{th} term by 7, find the common difference. [*CBSE 2019*]

Q.75 Which term of the arithmetic progression 3, 15, 27, 39 ..... will be 120 more than its 21st term ? [*CBSE 2019*]

Q.76 The first term of an AP is 3, the last term is 83 and the sum of all its terms is 903. Find the number of terms and the common difference of the AP. [*CBSE 2019*]

Q.77 If the sum of the first p terms of an AP is q and the sum of the first q terms is p; then show that the sum of the first $(p + q)$ terms is $-(p + q)$. [*CBSE 2019*]

Q.78 The value of x for which $2x$, $(x + 10)$ and $(3x + 2)$ are the three consecutive terms of an AP, is

(a) 6 (b) – 6

(c) 18 (d) –18 [*CBSE 2020*]

Q.79 The first term of an AP is p and the common difference is q, then its 10^{th} term is

(a) $q + 9p$ (b) $p - 9q$

(c) $p + 9q$ (d) $2p + 9q$ [*CBSE 2020*]

Q.80 Show that $(a - b)^2$, $(a^2 + b^2)$ and $(a + b)^2$ are in AP. [*CBSE 2020*]

Q.81 The sum of four consecutive numbers in AP is 32 and the ratio of the product of the first and last terms to the product to two middle terms is 7 : 15. Find the numbers. [*CBSE 2020*]

Q.82 Solve : $1 + 4 + 7 + 10 + ... + x = 287$ [*CBSE 2020*]

Q.83 Find the sum of first 20 terms of the following AP : 1, 4, 7, 10, ... [*CBSE 2020*]

Q.84 The sum of the first 7 terms of an AP is 63 and that of its next 7 terms is 161. Find the AP. [*CBSE 2020*]

6 CHAPTER

Coordinate Geometry

Q.1 Find the value of a, so that the point (3, a) lie on the line $2x - 3y = 5$. [*CBSE 2009*]

Q.2 If the point A(0,2) is equildistant from the points B(3, p) and C(p, 5), find p. Also find the length of AB. [*CBSE 2014*]

Q.3 If the points A(–2, 1), B(a, b) and C(4, –1) are collinear and $a - b = 1$, find the values of a and b.[*CBSE 2014*]

Q.4 If the point P(k –1, 2) is equidiistant from the points A(3, k) and B(k, 5), find the values of k. [*CBSE (Al)2014*]

Q.5 Find the ratio in which the line segment joining the points A(3, –3) and B(–2, 7) is divided by x-axis. Also find the coordinates of the point of division. [*CBSE(Al) 2014*]

Q.6 Find the ratio in which the point P(x, 2), divides the line segment joining the points A(12, 5) and B(4, –3). Also find the value of x. [*CBSE 2014*]

Q.7 If A (4, 2), B (7, 6) and C(1, 4) are the vertices of a ΔABC and AD is its median, prove that the median AD divides into two triangles of equal areas. [*CBSE(Al) 2014*]

Q.8 The base BC of an equilateral triangle ABC lies on y-axis. The coordinates of point C are (0, –3). The origin is the mid-point of the base. Find the coordinates of the points A and B. Also find the coordinates of another point D such that BACD is a rhombus. [*CBSE 2014*]

Q.9 If the points P(–3, 9), Q(a, b) and R(4, –5) are collinear and $a + b = 1$, find the values of a and b. [*CBSE 2014*]

Q.10 Find the value(s) of k for which points ($3k$ –1, k –2), (k,k–7) and (k –1, – k –2) are collinear. [*CBSE 2014*]

Q.11 Points P, Q, R and S divide the line segment joining the points A(1,2) and B(6, 7) in 5 equal parts. Find thecoordinates of the points P, Q and R.[*CBSE 2014*]

Q.12 The mid-point P of the line segment joining the points A(–10, 4) and B(–2,0) lies on the line segment joining the points C(–9, –4) and (–4, y). Find the ratio in which P divides CD. Also find the value of y. [*CBSE 2014*]

Q.13 If A(–4, 8), B(–3, –4), C(0, –5) and D(5, 6) are the vertices of a quadrilateral ABCD, find its area. [*CBSE 2014*]

Q.14 Points A(–1, y) and B(5,7) lie on a circle with centre O(2, –3y). Find the values of y. Hence find the radius of the circle. [*CBSE 2014*]

Q.15 If A (–3, 5), B(–2, –7), C(1, –8) and D(6, 3) are the vertices of a quadrilateral ABCD, find its area. [*CBSE 2014*]

Q.16 A(4, –6), B(3, –2) and C(5, 2) are the vertices of a ΔABC and AD is its median. Prove that the median AD divides ΔABC into two triangles of equal areas. [*CBSE(Al) 2014*]

Q.17 If A(5,2), B(2,–2) and C(–2, t) are the vertices of a right angled triangle with $\angle B = 90°$, then find the value of t. [*CBSE 2015*]

Q.18 Point A lies on the line segment PQ joining P(6, –6) and Q(–4, –1) in such a way that $\frac{PA}{PQ} = \frac{2}{5}$. If point P also lies on the line $3x + k(y + 1) = 0$, find the value of k. [*CBSE 2015*]

Q.19 The base QR of an equilateral triangle PQR lies on x-axis. The coordinates of point Q are (–4, 0) and the origin is the mid-point of the base. Find the coordinates of the points P and R. [*CBSE 2015*]

Q.20 Find the values of k so that area of the triangle with vertices (1, –1), (–4, 2k), and (–k, –5) is 24 sq. units. [*CBSE 2015*]

Q.21 Find the ratio in which y-axis divides the line segment joining the points A(5, –6) and B(–1, –4). Also find the coordinates of the point of division. [*CBSE 2016*]

Q.22 Let P and Q be the points of trisection of the line segment joining the points A(2, –2) and B(–7, 4) such that P is nearer to A. Find the coordinates of Pand Q. [*CBSE(Al)2016*]

Q.23 Find the ratio in which the point $(-3, k)$ divides the liner-segment joining the points $(-5, -4)$ and $(-2, 3)$. Also find the value of k. [*CBSE 2016*]

Q.24 The x-coordinate of a point P is twice its y-coordinate. If P is equidistant from Q(2, –5) and R(–3, 6), find the coordinates of P. [*CBSE 2016*]

Q.25 If the point P(x, y) is equidistant from the points A$(a + b, b - a)$ and B$(a - b, a + b)$. Prove that $bx = ay$. [*CBSE (Al)2016*]

Q.26 If the point C(–1, 2) divides internally the line segment joining the point A(2, 5) and B(x, y) in the ratio of 3 : 4, find the value of $x^2 + y^2$. [*CBSE 2016*]

Q.27 Prove that the area of a triangle with vertices $(t, t - 2)$, $(t + 2, t + 2)$ and $(t + 3, t)$ is independent of t. [*CBSE 2016*]

Q.28 Find the coordinates of a point on the x-axis which is equidistant from the points A(2, –5) and B(–2, 9). [*CBSE 2016*]

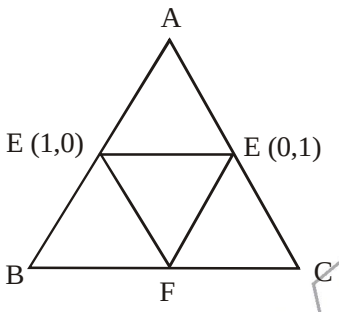
Q.29 The coordinates of the points A, B and C are (6, 3), (–3, 5) and (4, –2) respectively. P(x, y) is any point in the plane. Show that $\frac{ar(\Delta PBC)}{ar(\Delta ABC)} = \frac{x + y - 2}{7}$. [*CBSE 2016*]

Q.30 Prove that the points (3,0),(6,4) and (–1,3) are the vertices of a right angled isosceles triangle. [*CBSE (Al)2016*]

Q.31 Find the area of quadrilateral ABCD, the co-ordinates of whose vertices are A(1, 2), B (6,2), C(5, 3) and D(3, 4). [*CBSE 2016*]

Q.32 Prove that the points (2, –2), (–2,1) and (5,2) are the vertices of a right angled triangle. Also find the area of this triangle. [*CBSE 2016*]

Q.33 In given figure ABC is a triangle coordinates of whose vertex A are (0, –1). D and E respectively are the mid-points of the sides AB and AC and their coordinates are (1, 0) and (0, 1) respectively. If F is the mid-point of BC, find the areas of ΔABC and ΔDEF. [*CBSE 2016*]



Q.34 If the distance between the points $(4, k)$ and (1, 0) is 5, then what can be the possible value of k ? [*CBSE 2017*]

Q.35 Show that ΔABC, where A(–2, 0), B(2, 0), C(0,2) and ΔPQR where P(–4, 0), Q(4, 0), R(0, 4) are similar triangles. [*CBSE 2017*]

Or

Show thqat ΔABC with vertices A(–2, 0), B(0, 2) and C(2,0) to similar to ΔDEF with vertices D(–4, 0), F(4, 0) and E(0, 4). [ΔPQR is replaced by ΔDEF). [*CBSE 2017*]

Q.36 It two adjacent vertices of a parallelogram are (3, 2) and (–1, 0) and the diagonals intersect at (2, –5), then find the coordinates of the other two vertices. [*CBSE 2017*]

Q.37 Find the values of k if the points A$(k + 1, 2k)$, B$(3k, 2k + 3)$ and C$(5k - 1, 5k)$ are collinear. [*CBSE (Al)2017*]

Q.38 In the given figure, ΔABC is an equilateral triangle of side 3 units. Find the coordinates of the other two vertices. [*CBSE 2017*]

Q.39 The area of a triangle is 5 sq units. Two its vertices are (2, 1) and (3, –2). If the third vertex is $\left(\frac{7}{2}, y\right)$, find the value of y. [*CBSE 2017*]

Q.40 If $a \neq b \neq 0$, prove that the points (a, a^2), (b, b^2), (0,0) will not be collinear. [*CBSE 2017*]

Q.41 The line segment joining the points A(3, –4) and B(1,2) is trisected at the points Pand Q, where P is nearer to A. Find the coordinates of point P. [*CBSE 2017*]

Q.42 Find the coordinates of the point on the y-axis which is equidistant form the points A(5, 3) and B(1, –5). [*CBSE 2017*]

Q.43 Find the area of a quadrilateral PQRS whose vertices are P(4, 3), Q(10, –1), R(15, 4) and S(10, 23). [*CBSE 2017*]

Q.44 In what ratio does the point P(–4, 6) divide the line segment joining the points. A(–6, 10) and B(3, –8) ? [*CBSE 2017*]

Q.45 Find the value of k for which the points (–5,1), (1, k) and (4, –2) are collinear. [*CBSE 2017*]

Q.46 If the distance of P(x, y) from A(5, 1) and B(–1, 5) are equal, prove that $3x = 2y$. [*CBSE 2017*]

Q.47 Find the distance of a point P(x, y) from the prigin. [*CBSE 2018*]

Q.48 A(5,1); B (1, 5) and C(–3, –1) are the vertices of ΔABC. Find the length of median AD. [*CBSE 2018*]

Q.49 Find the ratio in which P(4, m) divides hte line segment joining the points A(2, 3) and B(6, –3). Hence find m. [*CBSE 2018*]

Q.50 Find the linear relation between x and y such that P(x, y) is equidistant from the points A(1, 4) and B(–1,2). [*CBSE 2018*]

Q.51 If A (–2,1), B(a, 0), C(4, b) and D(1,2) are vertices of a parallelogram ABCD, find the values of a and b. Hence find the lengths of its sides. [*CBSE 2018*]

Q.52 If A(–5, 7), B(–4,–5), C(–1, –6) and D(4, 5) are vertices of a quadrilateral, find the area of the quadrilateral ABCD. [*CBSE 2018*]

Q.53 If coordinates of two adjacent vertices of a parallelogram are (3,2), (1,0) and diagonals bisect each other at (2, –5), find coordinates of the other two vertices. [*CBSE 2018*]

Q.54 If the area of triangle with vertices (x, 3), (4,4) and (3, 5) is 4 square units, find x. [*CBSE 2018*]

Q.55 Find the coordinates of a point A, where AB is a diameter of the circle with centre (–2, 2) and B is the point with coordinates (3, 4). [*CBSE 2019*]

Or

Find the coordinaes of a point A, where AB is a diameter of the circle with centre (3, –1) and the point B is (2,6) [*CBSE 2019*]

Q.56 The mid point of the line segment joining A ($2a$, 4) and B(–2, $3b$) is (1, $2a$ + 1). Find the values of a and b. [*CBSE 2019*]

Q.57 Point P divides the line segment joining the points A(2, 1) and B(5, –8) such that $\frac{AP}{PB} = \frac{1}{3}$. If P lies on the line $2x - y + k = 0$, find the value of k. [*CBSE 2019*]

Q.58 Find the coordinates of a point A, where AB is diameter of a circle whose centre is (2, –3) and B is the point (1,4). [*CBSE 2019*]

Q.59 Write the coordinates of a point P on x-axis which is equidistant from the points A(–2, 0) and B(6, 0). [*CBSE 2019*]

Q.60 Find the distance between the points (a, b) and $(-a, -b)$. [*CBSE 2019*]

Q.61 Find the value of 'a' so that the point $(3, a)$ lies on the line represented by $2x - 3y = 5$. [*CBSE 2019*]

Q.62 In what ratio is the line segment joining the points P(3, – 6) and Q(5,3) divided by x-asix ? [*CBSE 2019*]

Q.63 Find the ratio in which the segment joining the points (1, –3) and (4, 5) is divided by x-asix ? Also find the coordinates of this point on x-axis. [*CBSE 2019*]

Q.64 Find the area of a triangle whose vertices are given as (1, –1); (–4, 6) [*CBSE 2019*]

Q.65 Points A(3,1), B(5,1), C(a, b) and D(4, 3) are vertices of a parallelogram ABCD. Find the values of a, and b. [*CBSE 2019*]

Q.66 Points P and Q trisect the line segment joining the points A(–2, 0) and B(0, 8) such that P is near to A. Find the coordinates of points P and Q. [*CBSE 2019*]

Q.67 The point R divides the lines segment AB, where A(–4,0) and B(0,6) such that AR= $\frac{3}{4}$ AB. Find the coordinates of R. [*CBSE 2019*]

Q.68 Find the relation between x and y such that points (x, y), (1,2) and (7, 0) are collinear. [*CBSE 2019*]

Q.69 If A(–2,2), B(5,2) and C$(k,8)$ are the vertices of the a right-angle triangle ABC with $\angle B = 90°$, then find the value of k. [*CBSE 2019*]

Q.70 Find the point on y-axis which is equidistant from the points (5, –2) and (–3, 2). [*CBSE 2019*]

Q.71 The line segment joining the points A(2,1) and B(5, –8) is trisected at the points P and Q such that P is nearer to A. If P also lies on the line given by $2x - y + k = 0$, find the value of k. [*CBSE 2019*]

Q.72 Find the ratio in which the line $x - 3y = 0$ divides the line segment joining the points (–2, –5) and (6, 3). Find the coordinates of the point of intersection. [*CBSE 2019*]

Q.73 Point A lies on the line segment XY joining X(6, –6) and Y(–4, –1) in such a way that $\frac{XA}{XY} = \frac{2}{5}$. If point A also lies on the line $3x + k(y + 1) = 0$, find the value of k. [*CBSE 2019*]

Q.74 Find the area of the triangle formed by joining the mid-points of the sides of the triangle ABC, whose vertices are A(0, –1), B(2,1) and C(0, 3) [*CBSE 2019*]

Q.75 Find the value of k so that the area of trangle ABC with A$(k + 1,1)$, B (4, –3) and C$(7, -k)$ is 6 square units. [*CBSE 2019*]

Q.76 In what ratio does the point P$(-4, y)$ divide the line segment joining the point A(–6,10) and B(3, –8) ? Hence find the value of y. [*CBSE 2019*]

Q.77 Find the value of p for which the points (–5,1), $(1, p)$ and (4, –2) are collinear. [*CBSE 2019*]

Q.78 The line segment joining the points A(2, 1) and B(5, 8) is trisected by the points P and Q, where P is nearer to A. If the point P also lies on the line $2x - y + k = 0$, find the value of k. [*CBSE 2019*]

Q.79 Show that (a, a), $(-a, -a)$ and $\left(-\sqrt{3}a, \sqrt{3}a\right)$ are vertices of an equilateral tiangle. [*CBSE 2019*]

Q.80 If the point P$(k, 0)$ divides the line segment joining the points A(2, –2) and B(–7, 4) in the ratio 1 : 2, then the value of k is

(a) 1 (b) 2

(c) –2 (d) – 1 [*CBSE 2020*]

Q.81 The value of p, for which the point A(3,1), B(5, p) and C(7, –5) are collinear, is

(a) –2 (b) 2

(c) –1 (d) 1 [*CBSE 2020*]

Q.82 If the point C(–1, 2) divides internally the line segment joining A(2, 5) and B(x, y) in the ratio 3 : 4, find the coordinates of B. [*CBSE 2020*]

7 CHAPTER

Triangles

Q.1 Give $\Delta ABC \sim \Delta PQR$, if $\frac{AB}{PQ} = \frac{1}{3}$, then find $\frac{ar\Delta ABC}{ar\Delta PQR}$. [CBSE 2018]

Q.2 If $\Delta ABC \sim \Delta QRP$, $\frac{ar\Delta ABC}{ar\Delta QRP} = \frac{9}{4}$ and BC = 15 cm, then find PR. [CBSE 2018]

Q.3 X is a point on the side BC of ΔABC. XM and XN are drawn parallel to AB and AC respectively meeting AB in N and AC in M. MN produced meets CB produced at T. Prove that $TX^2 = TB \times TC$. [CBSE 2018]

Q.4 Prove that the area of an equilateral triangle described on one side of the square is equal to half the area of the equilateral triangle described on one of its diagonal. [CBSE 2018]

Q.5 If the area of two similar triangles are equal, prove that they are congruent. [CBSE 2018]

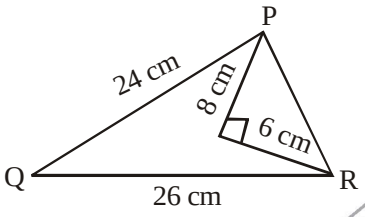
Q.6 In an equilateral ΔABC, D is a point on side BC such that BD = $\frac{1}{3}$BC. Prove that $9(AD)^2 = 7(AB)^2$. [CBSE 2018]

Q.7 Prove that, in a right triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides. [CBSE 2018]

Q.8 Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides. [CBSE 2018]

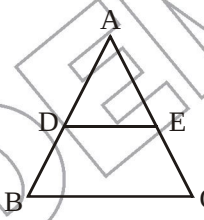
Q.9 In the triangle, if the square on one side is equal to the sum of the squares on the other two sides, prove that the angle opposite to the first side is a right angle.

Use the above theorem to find the measure of $\angle PKR$.

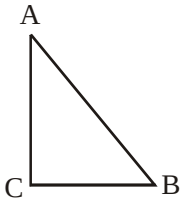


[CBSE 2019]

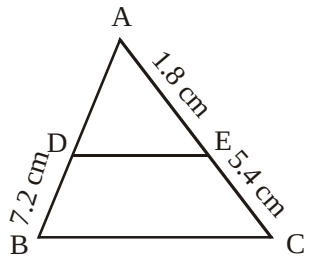
Q.10 In figure below DE || BC, AD = 1 cm and BD = 2 cm. What is the ratio of the *ar*(ABC) to the *ar*(ΔADE) ? [CBSE 2019]



Q.11 In figure below ABC is an isosceles triangle right angled at C with AC = 4 cm. Find the length of AB. [CBSE 2019]

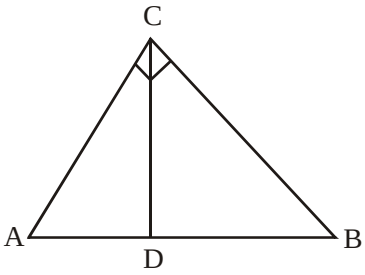


Q.12 In figure below DE || BC. Find the length of side AD, given that AE=1.8 cm, BD = 7.2 cm and CE = 5.4 cm. [*CBSE 2019*]



Q.13 Let $\Delta ABC \sim \Delta DEF$ and their areas be respectively, 64 cm^2 and 121 cm^2. If EF = 15.4 cm, find BC. [*CBSE 2019*]

Q.14 In figure below $\angle ACB = 90°$ and $CD \perp AB$, prove that $CD^2 = BD \times AD$. [*CBSE 2019*]



Q.15 If P and Q are the points on side CA and CB respectively of ΔABC, right angled at C, prove that $(AQ^2 + BP^2) = (AB^2 + PQ^2)$ [*CBSE 2019*]

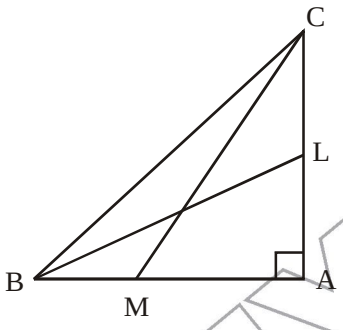
Q.16 Diagonals of a trapezium PQRS intersect each other at the point O, PQ || RS and PQ = 3RS. Find the ratio of the areas of triangle POQ and ROS. [*CBSE 2019*]

Q.17 The perpendicular from A on side BC of a ΔABC meets BC at D such that DB = 3CD. Prove that $2AB^2 = 2AC^2 + BC^2$. [*CBSE 2019*]

Q.18 AD and PM are medians of triangles ABC and PQR respectively where $\Delta ABC \sim \Delta PQR$. Prove that $\frac{AB}{PQ} = \frac{AD}{PM}$. [*CBSE 2019*]

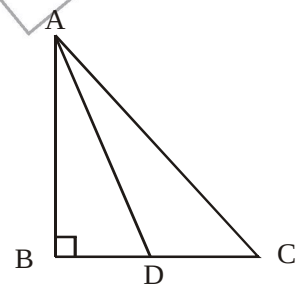
Q.19 ABC is a right triangle in which $\angle B = 90°$. If AB = 8 cm and BC = 6 cm, find the diameter of the circle inscribed in the triangle. [*CBSE 2019*]

Q.20 In figure below BL and CM are medians of a ΔABC right-angled at A. Prove that $4(BL^2 + CM^2) = 5\,BC^2$. [*CBSE 2019*]



Q.21 Prove that the sum of the squares of the sides of a rhombus is equal to the sum of the squares of its diagonals. [*CBSE 2019*]

Q.22 In figure ΔABC, $\angle B = 90°$ and D is the mid-point of BC. Prove that $AC^2 = AD^2 + 3CD^2$. [*CBSE 2019*]

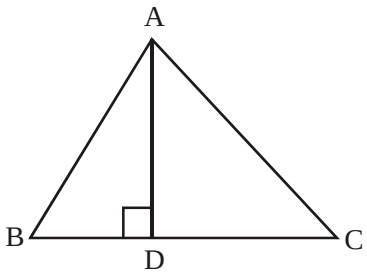


Q.23 ABCD is a trapezium with AB || DC. E and F are points on non-parallel sides AD and BC respectively, such that EF || AB. Show that $\frac{AE}{ED} = \frac{BF}{FC}$. [*CBSE 2019*]

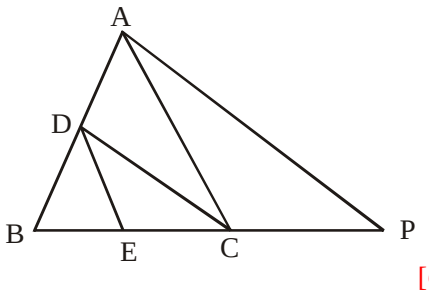
Q.24 Prove that in a right-triangle the square of the hypotenuse is equal to the sum of the squares of the other two sides. [*CBSE 2019*]

Q.25 In a triangle, if square of one side is equal to the sum of the squares of the other two sides, then prove that the angle opposite the first side is a right angle. [*CBSE 2019*]

Q.26 In figure below ΔACB, $AD \perp BC$. Prove that $AC^2 = AB^2 + BC^2 - 2BC \times BD$. [*CBSE 2019*]



Q.27 In fig., DE || AC and DC || AP, Prove that $\frac{BE}{EC} = \frac{BC}{CP}$.

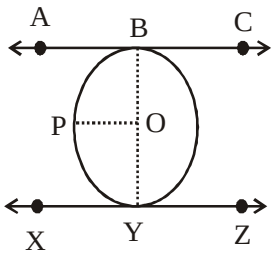


[*CBSE 2020*]

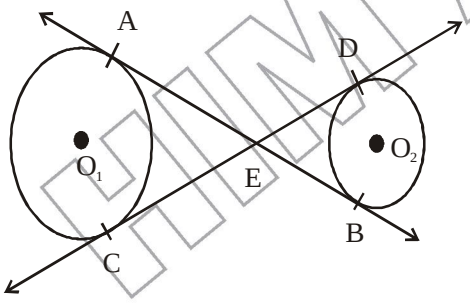
Q.28 Determine graphically the coordinates of the vertices of triangle, the equations of whose sides are given by $2y - x = 8$, $5y - x = 14$ and $y - 2x = 1$. [*CBSE 2020*]

8 CHAPTER — Circles

Q.1 Prove that the line segment joining the points of two parallel tangents of a circle, passes through its centre. [*CBSE 2014*]

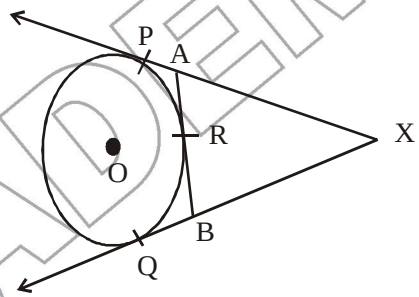


Q.2 In fig., common tangents AB and CD to two circles with centres O_1 and O_2 intersect at E. Prove that AB = CD. [*CBSE (Al) 2014*]

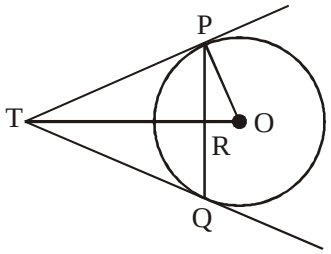


Q.3 The incircle of an isosceles triangle ABC, in which AB=AC, touches the sides BC, CA and AB at D, E and F respectively. Prove that BD = DC. [*CBSE 2014*]

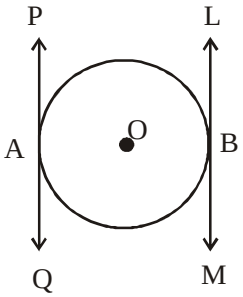
Q.4 In Fig., XP and XQ are two tangents to the circle with centre O, Drawn from an external point X. ARB is another tangent, touching the circle at R. Prove that XA + AR = XB + BR. [*CBSE 2014*]



Q.5 In fig., PQ is a chord of length 16 cm, of a circle of radius 10 cm. The tangents at P and Q intersect at a point T. Find the length of TP. [*CBSE 2014*]



Q.6 Prove that the tangents drawn at the ends of a diameter of a circle are parallel. [*CBSE 2014,2017, 2019*]



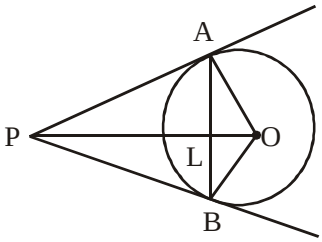
Q.7 Prove that the tangent to a circle is perpendicular to the radius through the point of contact.[*CBSE 2014, 2020*]

Q.8 Prove that the lengths of two tangents drawn from an external point to a circle are equal.

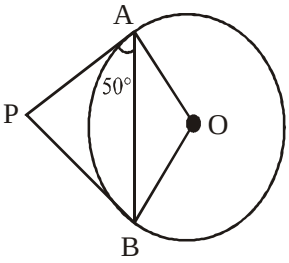
[*CBSE 2014, 2016, 2017*]

Q.9 Prove that the parallelogram circumscribing a circle is a rhombus. [*CBSE 2014, 2019*]

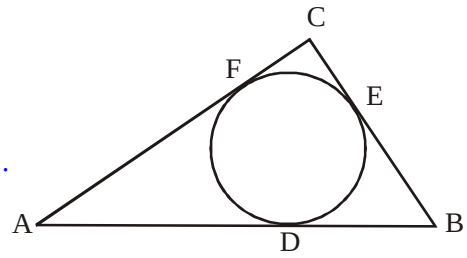
Q.10 AB, is a chord of a circle, with centre O, such that AB = 16 cm and radius of circle is 10 cm. Tangents at A and B intersect each other at P. Find the length of PA. [*CBSE 2015*]



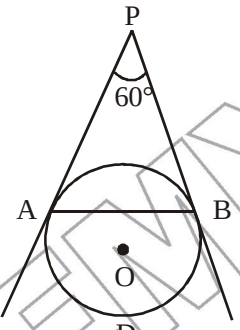
Q.11 From an external point P, tangents PA and PB are drawn to a circle with centre O. If ∠PAB = 50°, then find ∠AOB. [*CBSE 2016*]



Q.12 In fig., a circle is inscribed in a ΔABC, such that it touches the sides AB, BC and CA at points D, E and F respectively. If the lengths of sides AB, BC and CA are 12 cm, 8 cm and 10 cm respectively, find the lengths of AD, BE and CF. [*CBSE 2016*]

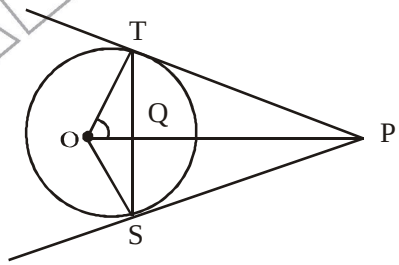


Q.13 In Fig., AP and BP are tangents to a circle with centre O, such that AP = 5 cm and ∠APB = 60° Find the length of chord AB. [*CBSE 2016*]

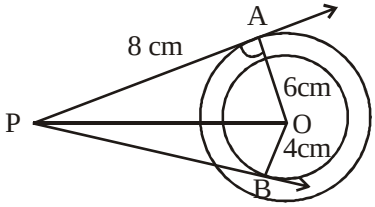


Q.14 In Fig., from an external point P, two tangents PT and PS are drawn to a circle with centre O and radius *r*. If OP = 2*r*, show that ∠OTS = ∠OST = 30°.

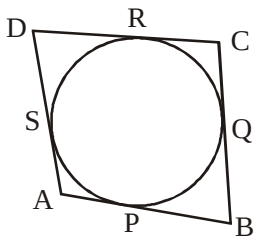
[*CBSE 2016*]



Q.15 In Fig., are two concentric circles of radii 6 cm and 4 cm with centre O. If AP is a tangent to the larger circle and BP to the smaller circle and length of AP is 8 cm, find the length of BP. [*CBSE 2016*]



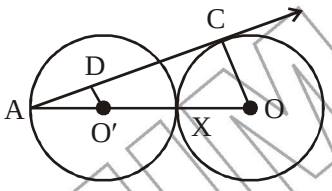
Q.16 A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC. [*CBSE 2016*]



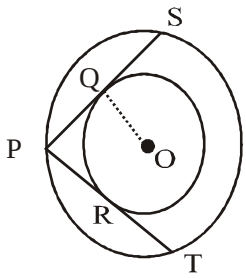
Or

A circle touches all the four sides of a quadrilateral ABCD. Prove that AB + CD = BC + DA. [*CBSE 2017*]

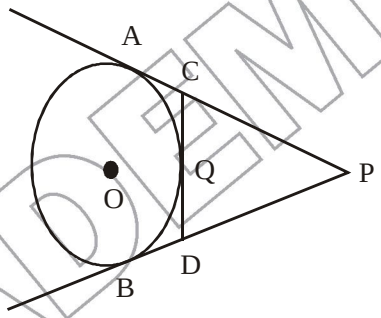
Q.17 In fig., two equal circles, with centres O and O′, touch each other at X.OO′ produced meets the circle with centre O′ at A.AC is tangent to the circle with centre O, at the point C. O′D is perpendicular to AC. Find the value of $\frac{DO'}{CD}$ [*CBSE(Al) 2016*]



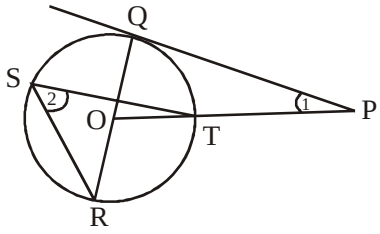
Q.18 In fir., there are two concentric circles with center O. PRT and PQS are tangents to the inner circle from a point P lying on the outer circle. If PR = 5 cm, find the length of PS. [*CBSE 2017*]



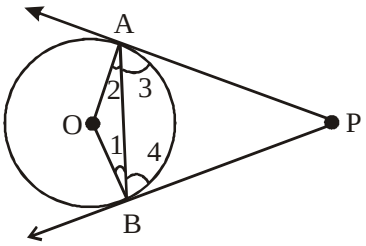
Q.19 In fig., PA and PB are tangents to the circle from an external point P, CD is another tangent touching the circle at Q. If PA = 12 cm, QC = QD = 3 cm, thenfind PC + PD. [*CBSE 2017*]



Q.20 In Fig., PQ is a tangent from an external point P to a circle with centre O and OP cuts the circle at T and QOR is a diameter. If ∠POR = 130° and S is a point on the circle, find ∠1 + ∠2. [*CBSE 2017*]



Q.21 Prove that the tangents drawn at the ends of a chord of circle make equal angles with the chord.



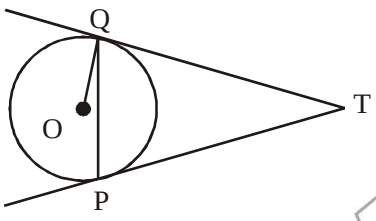
[*CBSE 2017*]

Q.22 PQ is a tangent drawn from an external point P to a circle with centre O, QOR is the diameter of the circle. If ∠POR = 120°, what is the measure of ∠OPQ ?
[*CBSE 2017*]

Q.23 If the angle between two tangents drawn from an external point P to a circle of radius *a* and centre O, is 60°, then find the length of OP. [*CBSE(Al) 2017*]

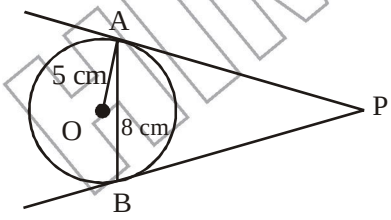
Q.24 If the angle between two tangents drawn from an external point P to a circle of radius a and centre O is 60°, then find the length of OP. [*CBSE(Al) 2017*]

Q.25 Two tangents TP and TQ are drawn to a circle with centre O from an external point T prove that ∠PTQ =2∠OPQ. [*CBSE 2017*]

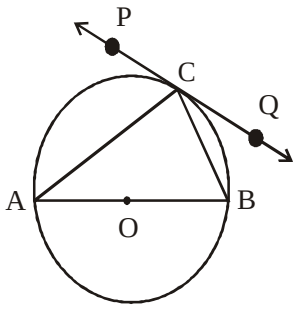


Q.26 Prove that the lengths of tangents drawn from an external point to a circle are equal. [*CBSE 2018*]

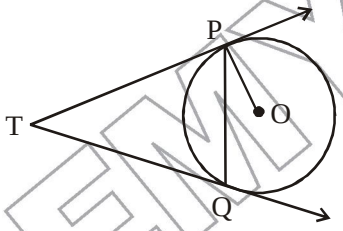
Q.27 In fig. AB is a chord of length 8 cm of a circle of radius 5cm. The tangents to the circle at A and B intersect at P. Find the length of AP. [*CBSE 2018*]



Q.28 In PQ is a tangent at a point C to a circle with centre O. If AB is a diameter and ∠CAB = 30°, find ∠PCA.
[*CBSE (Al)2019*]



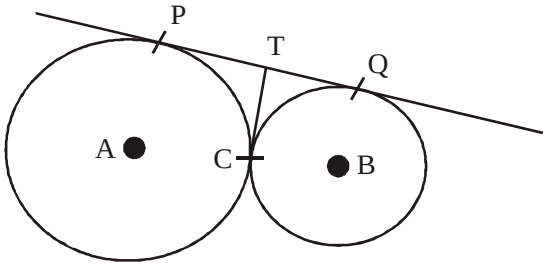
Q.29 In Fig., two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that ∠PTQ = 2 ∠OPQ. [*CBSE 2020*]



Q.30 A piece of wire 22 cm long is bent into the form of an arc of a circle subtending an angle of 60° at its centre. Find the radius of the circle. $\left[\text{Use } \pi = \frac{22}{7}\right]$
[*CBSE 2020*]

Q.31 Draw a line segment AB of length 7 cm. Taking A as centre, draw a circle of radius 3 cm and taking B as centre, draw another circle of radius 2 cm. Construct tangents to each circle from the centre of the other circle. [*CBSE 2020*]

Q.32 In fig. two circles touch each other at the point C. Prove that the common tangent to the circles at C, bisects the common tangent at P and Q. [*CBSE 2020*]



9 CHAPTER

Constructions

Q.1 Let ABC be a right triangle in which AB = 6 cm, BC = 8 cm and ∠B = 90°. BD is the perpendicular from B on AC. The circle through B, C, D is drawn. Construct the tangents from A to this circle. [*CBSE 2014*]

Q.2 Draw a line segment AB of length 7 cm. Taking A as centre, draw a circle of radius 3 cm and taking B as centre, draw another circle of radius 2 cm. Construct tangents to each circle from the centre of the other circle. [*CBSE 2015*]

Q.3 Construct a triangle with sides 5 cm, 5.5 cm and 6.5cm. Now construct another triangle, whose sides are $\frac{3}{5}$ times the corresponding sides of the given triangle. [*CBSE(Al) 2014*]

Q.4 Construct a triangle ABC, in which AB = 5 cm, BC = 6cm and AC = 7 cm. Then construct another triangle whose sides are $\frac{3}{5}$ times the corresponding sides of ΔABC. [*CBSE 2014*]

Q.5 Draw a circle of radius 4 cm. Construct a pair of tangents to it, the angle between which is 60°. Also justify the construction. Measure the distance between the centre of the circle and the point of intersection of tangents. [*CBSE 2016*]

Q.6 Draw two concentric circles of radii 3 cm and 5 cm. Construct a tangent to smaller circle from a point on the larger circle. Also measure its length. [*CBSE 2016*]

Q.7 Draw a ΔABC in which AB = 4 cm, BC = 5 cm and AC=6 cm. Then construct another triangle whose sides are $\frac{3}{5}$ of the corresponding sides of ΔABC. [*CBSE 2016*]

Q.8 Draw a triangle with sides 4 cm, 5 cm and 6 cm and then construct another triangle whose sides are $\frac{2}{3}$ of the corresponding sides of first triangle. [*CBSE 2017*]

Q.9 Construct an isosceles triangle whose base is 8cm and altitude 4 cm and then draw another triangle whose sides are $1\frac{1}{2}$ times the corresponding sides of the isosceles triangle. [*CBSE 2017*]

Q.10 Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and ∠ABC = 60°. Then construct a triangle whose sides are $\frac{3}{4}$ th of the corresponding sides of the triangle ABC. [*CBSE 2017*]

Q.11 Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle. [*CBSE 2017*]

Q.12 Draw a circle of radius of 3 cm. Take two points P and Q on one of its diameters extended on both sides, each at a distance of 7 cm on opposite sides of its centre. Draw tangents to the circle from these two points P and Q. [*CBSE 2017*]

Q.13 Draw a ΔABC with side BC = 7 cm, $\angle B = 45°$, $\angle A = 105°$. Then, construct a triangle whose sides are $\frac{3}{4}$ times the corresponding sides of ΔABC. [*CBSE 2017*]

Or

Construct a triangle ABC with side BC = 6 cm, $\angle B = 45°$, $\angle A = 105°$. Then construct another triangle whose sides are $\frac{3}{4}$ times the corresponding sides of the ΔABC. [*CBSE 2019*]

Q.14 Draw a line segment of length 8 cm and divide it internally in the ratio 4 : 5. [*CBSE 2017*]

Q.15 Draw a line segment of length 7 cm and divide it internally in the ratio 2 : 3. [*CBSE 2017*]

Q.16 Draw a right triangle in which the sides (other than hypotenuse) are 8 cm and 6 cm. Then construct another triangle whose sides are $\frac{3}{4}$ times the (corresponding) sides of given triangle. [*CBSE 2017*]

Q.17 Draw a right triangle in which the sides (other than the hypotenuse) are of lengths 4 cm and 3 cm. Now construct another triangle whose sides are $\frac{3}{5}$ times the corresponding sides of the given triangle. [*CBSE 2017*]

Q.18 Draw a triangle ABC with BC = 6 cm, AB = 5 cm and $\angle ABC = 60°$. Then construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the ΔABC. [*CBSE 2018*]

Q.19 Construct an isosceles triangle whose base is 8 cm and altitude 4 cm and then draw another triangle whose sides are $\frac{3}{4}$ times the corresponding sides of the isosceles triangle. [*CBSE 2019*]

Q.20 Construct a right triangle in which sides (other than the hypotenuse) are 8 cm and 6 cm. Then construct another triangle whose sides are $\frac{3}{5}$ times the corresponding sides of the right triangle. [*CBSE 2019*]

Q.21 Construct a ΔABC in which CA = 6 cm, AB = 5 cm and $\angle BAC = 45°$. Then construct a triangle whose sides are $\frac{3}{5}$ of the corresponding sides of ΔABC. [*CBSE 2019*]

Q.22 Construct an equilateral ΔABC with each side 5 cm. Take a point P on the outer circle and construct a pair of tangents PA and PB to the smaller circle. Measure PA. [*CBSE 2019*]

Q.23 Construct a triangle ABC with side BC = 6cm, AB = 5 cm and $\angle ABC = 60°$. Then construct another triangle whose sides are $\frac{3}{4}$ of the corresponding sides of triangle ΔABC. [*CBSE 2019*]

Q.24 Construct a triangle, the lengths of whose sides are 5cm, 6cm and 7 cm. Now construct another triangle whose sides are $\frac{5}{7}$ times the corresponding sides of the first triangle. [*CBSE 2019*]

Q.25 Draw a circle of radius 4 cm. From a point 6 cm away from its centre, construct a pair of tangents to the circle and measure their lengths. [*CBSE 2019*]

Q.26 Construct a pair of tangents to a circle of radius 4 cm which are inclined to each other at an angle of 60°. [*CBSE 2019*]

Q.27 Draw a circle of radius 3 cm. Take a point A on its extended diameter at a distance of 7 cm from its centre. Draw two tangents to the circle from A. [*CBSE 2019*]

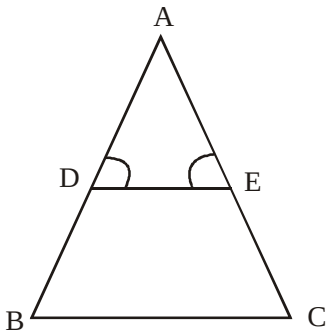
Q.28 Construct tangents to a circle of radius 4 cm from a point on the concentric circle of radius 7 cm. [*CBSE 2019*]

Q.29 Given $\Delta ABC \sim \Delta PQR$, if $\frac{AB}{PQ} = \frac{1}{3}$, then $\frac{ar(\Delta ABC)}{ar(\Delta PQR)}$ = ... [*CBSE 2020*]

Q.30 ABC is an equilateral triangle of side $2a$, then length of one of its altitude is ..... [*CBSE 2020*]

Q.31 Find the area of triangle PQR formed by the points P(–5, 7), Q(–4, –5) and R (4, 5). [*CBSE 2020*]

Q.32 In fig. $\angle D = \angle E$ and $\frac{AD}{DB} = \frac{AE}{EC}$, prove that BAC is an isosceles triangle. [*CBSE 2020*]



Q.33 In a triangle, if square of one side is equal to the sum of the squares of the other two sides, then prove that the anles opposite to the first side is a right angle. [*CBSE 2020*]

Q.34 ABC and BDE are two equilateral triangles such that D is the mid-point of BC. Ratio of the areas of triangles ABC and BDE is ..... [*CBSE 2020*]

Q.35 Construct a triangle with sides 4 cm, 5 cm and 6 cm. Then construct another triangle whose sides are $\frac{2}{3}$ times the corresponding sides of the first triangle. [*CBSE 2020*]

Q.36 Draw a ΔABC with BC = 7cm, $\angle B = 45°$ and $\angle A = 105°$. Then construct another triangle whose sides are $\frac{3}{4}$ times the corresponding sides of ΔABC. [*CBSE 2020*]

10 CHAPTER

Introduction to Trigonometry

Q.1 What is the value of $(\cos^2 67° - \sin^2 23°)$? [CBSE 2018]

Q.2 A, B, C are interior angles of ΔABC. Prove that $\text{cosec}\left(\frac{A+B}{2}\right) = \sec\frac{C}{2}$ [CBSE 2018]

Q.3 If 4 tanθ = 3, evaluate $\left(\frac{4\sin\theta - \cos\theta + 1}{4\sin\theta + \cos\theta - 1}\right)$. [CBSE 2018]

Q.4 If tan 2A = cot(A – 18°), where 2A is an angle, find the value of A. [CBSE 2018]

Q.5 Prove that : $\left(\frac{1+\tan^2 A}{1+\cot^2 A}\right) = \left(\frac{1+\tan A}{1+\cot A}\right)^2 = \tan^2 A$ [CBSE 2018]

Q.6 Evaluate : [CBSE 2018]

$$\frac{\cos 58°}{\sin 32°} + \frac{\sin 22°}{\cos 68°} - \frac{\cos 38° \cos ec 52°}{\sqrt{3}(\tan 18° \tan 35° \tan 60° \tan 72° \tan 55°)}$$

Q.7 Prove that :

$$\frac{\sin A - 2\sin^3 A}{2\cos^3 A - \cos A} = \tan A$$ [CBSE 2018]

Q.8 If $\sin(A + 2B) = \frac{\sqrt{3}}{2}$ and cos (A + 4B) = 0, A > B, and A + 4B ≤ 90°, then find A and B. [CBSE 2018]

Q.9 Evaluate :

(i) $\frac{\sin 18°}{\cos 72°}$ (ii) cos 48° – sin 42° [CBSE 2019]

Q.10 If sin *x* + cos *y* = 1; *x* = 30° and *y* is an acute angle, find the value of *y*. [CBSE 2019]

Q.11 Prove that : (1 + cot A – cosec A)(1 + tan A + secA)=2 [CBSE 2019]

Q.12 Prove that : $\frac{\tan\theta}{1-\tan\theta} - \frac{\cot\theta}{1-\cot\theta} = \frac{\cos\theta + \sin\theta}{\cos\theta - \sin\theta}$ [CBSE 2019]

Q.13 Prove that :

$(\sin A + \text{cosec } A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$. [CBSE 2019]

Q.14 Evaluate :

$$\frac{\cos ec^2(90° - \theta) - \tan^2\theta}{2(\cos^2 37° + \cos^2 53°)} - \frac{2\tan^2 30° \sec^2 37° \sin^2 53°}{\cos ec^2 63° - \tan^2 27°}$$ [CBSE 2019]

Q.15 Prove that :

$$\frac{\tan^2 A}{\tan^2 A - 1} + \frac{\cos ec^2 A}{\sec^2 A - \cos ec^2 A} = \frac{1}{1 - 2\cos^2 A}$$ [CBSE 2019]

Q.16 Prove that :

$$\frac{(1+\cot\theta + \tan\theta)(\sin\theta - \cos\theta)}{(\sec^3\theta - \text{cosec}^3\theta)} = \sin^2\theta \cos^2\theta$$ [CBSE 2019]

Q.17 Find A if tan 2A = cot (A – 24°) [CBSE 2019]

Q.18 Find the value of $(\sin^2 33° + \sin^2 57°)$ [CBSE 2019]

Q.19 Evaluate : $\sin^2 60° + 2\tan 45° - \cos^2 30°$ [CBSE 2019]

Q.20 If $\sin A = \frac{3}{4}$, calculate sec A. [CBSE 2019]

Q.21 If $\tan\alpha = \frac{5}{12}$, find the value of sec α [CBSE 2019]

Q.22 Evalute : $\frac{\tan 65°}{\cot 25°}$ [CBSE 2019]

Q.23 Express (sin 67° + cos75°) in terms of trigonometric ratios of the angle between 0° and 45°. [CBSE 2019]

Q.24 Evalute : $\frac{\tan 36^\circ}{\cot 54^\circ}$ [CBSE 2019]

Q.25 If $\text{cosec}^2\theta(1 + \cos\theta)(1 - \cos\theta) = k$, then find the value of k. [CBSE 2019]

Q.26 Prove that $(1 + \cot A - \text{cosec } A)(1 + \tan A + \sec A) = 2$ [CBSE 2019]

Q.27 Evaluate :

$$\left(\frac{3\sin 43^\circ}{\cos 47^\circ}\right)^2 - \frac{\cos 37^\circ \text{cosec } 53^\circ}{\tan 5^\circ \tan 25^\circ \tan 45^\circ \tan 65^\circ \tan 85^\circ}$$

[CBSE 2019]

Q.28 A, B and C are interior angles of a triangle ABC. Show that

(i) $\sin\left(\frac{B+C}{2}\right) = \cos\frac{A}{2}$

(ii) If A = 90°, then find the value of $\tan\left(\frac{B+C}{2}\right)$.

[CBSE 2019]

Q.29 If $\tan(A + B) = 1$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$, $0° < A + B < 90°$, $A > B$, then find the value of A and B. [CBSE 2019]

Q.30 Prove that :
$(\sin\theta + 1 + \cos\theta)(\sin\theta - 1 + \cos\theta)\sec\theta \text{ cosec } \theta = 2$ [CBSE 2019]

Q.31 Prove that :

$$\sqrt{\frac{\sec\theta - 1}{\sec\theta + 1}} + \sqrt{\frac{\sec\theta + 1}{\sec\theta - 1}} = 2 \text{ cosec } \theta$$ [CBSE 2019]

Q.32 Prove that :

$$\frac{\tan A}{1 + \sec A} - \frac{\tan A}{1 - \sec A} = 2 \text{ cosec } A$$ [CBSE 2019]

Q.33 Prove that :

$$1 + \frac{\cot^2\theta}{1 + \text{cosec}\,\theta}$$ [CBSE 2019]

Q.34 Prove that : $\frac{\sin A - \cos A + 1}{\sin A + \cos A - 1} = \frac{1}{\sec A - \tan A}$ [CBSE 2019]

Q.35 Prove that : $\frac{\sin\theta}{\cot\theta + \text{cosec}\,\theta} = 2 + \frac{\sin\theta}{\cot\theta - \text{cosec}\,\theta}$ [CBSE 2019]

Q.36 If $1 + \sin^2\theta = 3\sin\theta\cos\theta$, then prove that $\tan\theta = 1$ or $\tan\theta = \frac{1}{2}$. [CBSE 2019]

Q.37 Prove that :

$$\frac{\tan^3\theta}{1 + \tan^2\theta} + \frac{\cot^3\theta}{1 + \cot^3\theta} = \sec\theta \text{ cosec } \theta - 2\sin\theta\cos\theta.$$

[CBSE 2019]

Q.38 If $\sec\theta + \tan\theta = m$, show that $\frac{m^2 - 1}{m^2 + 1} = \sin\theta$. [CBSE 2019]

Q.39 Prove that :
$2(\sin^6\theta + \cos^6\theta) - 3(\sin^4\theta + \cos^4\theta) + 1 = 0$. [CBSE 2019]

Q.40 Prove that :

$$\frac{(1 + \cot\theta + \tan\theta)(\sin\theta - \cos\theta)}{(\sec^3\theta - \text{cosec}^3\theta)} = \sin^2\theta\cos^2\theta.$$

[CBSE 2019]

Q.41 If $\tan x = n \tan y$ and $\sin x = m \sin y$, prove that

$$\cos^2 x = \frac{m^2 - 1}{n^2 - 1}.$$ [CBSE 2019]

Q.42 If $x \sin^3\theta + y \cos^3\theta = \sin\theta \cos\theta$ and $x \sin\theta = y \cos\theta$, prove that $x^2 + y^2 = 1$. [*CBSE 2019*]

Q.43 The distance between the points $(a\cos\theta + b \sin\theta, 0)$ and $(0, a \sin\theta - b \cos\theta)$, is

(a) $a^2 + b^2$ (b) $a^2 - b^2$

(c) $\sqrt{a^2 + b^2}$ (d) $\sqrt{a^2 - b^2}$ [*CBSE 2020*]

Q.44 $\frac{\cos 80°}{\sin 10°} + \cos 59° \operatorname{cosec} 31° =$ ..... [*CBSE 2020*]

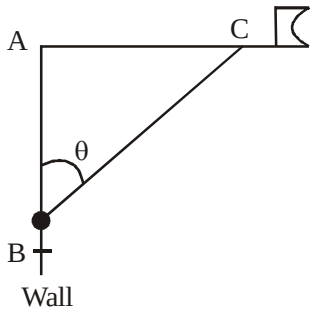
Q.45 The value of $\left(\sin^2\theta + \frac{1}{1 + \tan^2\theta}\right)$ [*CBSE 2020*]

Q.46 The value of $(1 + \tan^2\theta)(1 - \sin\theta)(1 + \sin\theta) =$ ..... [*CBSE 2020*]

Q.47 The rod AC of a TV disc antenna is fixed at right angles to the wall AB and a rod CD is supporting the disc as shown in Fig. If AC = 1.5 m long and CD = 3m, find (i) $\tan\theta$ (ii) $\sec\theta + \operatorname{cosec}\theta$. [*CBSE 2020*]

Q.48 $\left(\frac{\sin 35°}{\cos 55°}\right)^2 + \left(\frac{\cos 43°}{\sin 47°}\right)^2 - 2 \cos 60° =$ ..... [*CBSE 2020*]

Q.49 If $\sin\theta + \cos\theta = \sqrt{3}$, then prove that $\tan\theta + \cot\theta = 1$. [*CBSE 2020*]



Q.50 $\frac{2\cos 67°}{\sin 23°} - \frac{\tan 40°}{\cot 50°} - \cos 0° =$ ..... [*CBSE 2020*]

Q.51 Prove that : $\frac{\cot\theta + \operatorname{cosec}\theta - 1}{\cot\theta - \operatorname{cosec}\theta + 1} = \frac{1 + \cos\theta}{\sin\theta}$ [*CBSE 2020*]

Q.52 Prove that : $2(\sin^6\theta + \cos^6\theta) - 3(\sin^4\theta + \cos^4\theta) + 1 = 0$ [*CBSE 2020*]

11 CHAPTER

Heights and Distances

Q.1 Two ships are there in the sea on either side of a light house in such a way that the ships and the light house are in the same straight line. The angles of depression of two ships as observed from the top of the light house are 60° and 45°. If the height of the light house is 200 m, find the distance between the two ships.

[Use $\sqrt{3} = 1.73$] *[CBSE 2014]*

Q.2 The angle of elevation of an aeroplane from a point on the ground is 60°. After a flight of 30 seconds the angle of elevation becomes 30°. If the aeroplane is flying at a constant height of $3000\sqrt{3}$ m, find the speed of the aeroplane. *[CBSE 2014]*

Q.3 From the top of a 60 m high building, the angles of depression of the top and the bottom of a tower are 45° and 60° respectively. Find the height of the tower.

[Take $\sqrt{3} = 1.73$] *[CBSE 2014]*

Q.4 The angles of elevation and depression of the top and bottom of a lighthouse from the top of a building, 60 m high, are 30° and 60° respectively. Find

(i) the difference between the heights of the lighthouse and the building.

(ii) distance between the lighthouse and the building. *[CBSE 2014]*

Q.5 If two towers of height h_1 and h_2 subtend angle of 60° and 30° respectively at the mid-point of the line joining their feet, then find $h_1 : h_2$. *[CBSE 2015]*

Q.6 An observer, 1.7 m tall, is $20\sqrt{3}$ m away from a tower. The angle of elevation from the eye of observer to the top of tower is 30°. Find the height of tower. *[CBSE 2016]*

Q.7 A vertical tower stands on a horizontal plane and is surmounted by a flagstaff of height 5 m. From a point on the ground the angles of elevation of the top and bottom of the flagstaff are 60° and 30° respectively. Find the height of the tower and the distance of the point from the tower. (Take $\sqrt{3} = 1.732$) *[CBSE 2016]*

Q.8 Two men on either side of a 75 m high building and in line with base of building observe the angle of elevation of the top of the building as 30° and 60°. Find the distance between the two men (Use $\sqrt{3} = 1.73$) *[CBSE 2016]*

Q.9 A ladder, leaning against a wall, makes an angle of 60° with the horizontal. If the foot of the ladder is 2.5 m away from the wall, find the length of the ladder. *[CBSE (AI)2016]*

Q.10 A man standing on the deck of a ship, which is 10 m above water level, observes the angle of elevation of the top of a hill as 60° and the angle of depression of the base of hill as 30°. Find the distance of the hill from the ship and the height of the hill. *[CBSE(AI) 2016]*

Q.11 The angles of depression of the top and bottom of a 50m high building from the top of a tower are 45° and 60° respectively. Find the height of the tower and the horizontal distance between the tower and the building.

[Use $\sqrt{3} = 1.73$]. *[CBSE 2016]*

Q.12 A ladder 15 m long makes an anlge of 60° with the wall. Find the height of the point where the ladder touches the wall. *[CBSE 2017]*

Q.13 The ratio of the height of a tower and the length of its shadow on the ground is $\sqrt{3}:1$. What is the angle of elevation of the sun ? *[CBSE 2017]*

Q.14 If a tower 30 m high, casts a shadow $10\sqrt{3}$ m long on the ground, then what is the angle of elevation of the sun ? *[CBSE 2017]*

Q.15 A moving boat is observed from the top of a 150 m high cliff moving away from the cliff. The angle of depression of the boat changes from 60° to 45° in 2 minutes. Find the speed of the boat in m/h. *[CBSE 2017]*

Q.16 From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45°. Determine the height of the tower. *[CBSE 2017]*

Q.17 A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of 30°, which is approaching the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60°. Find the time taken by the car to reach the foot of the tower from this point. *[CBSE 2017]*

Q.18 From the top of a tower, 100 m high, a man observes two cars on the opposite sides of the tower and in same straight line with its base, with angles of depression 30° and 45°. Find the distance between the cars.

[Take $\sqrt{3}$ = 1.732] *[CBSE 2017]*

Q.19 The shadow of a tower at a time is three times as long as its shadow when the angle of elevation of the sun is 60°. Find the angle of elevation of the sun at the time of the longer shadow. *[CBSE 2017]*

Q.20 Form the top of a hill, the angles of depression of two consecutive kilometre stones due east are found to be 45° and 30° respectively. Find the height of the hill. *[CBSE 2017]*

Q.21 An observer, 1.5 m tall, is 28.5 m away from a 30 m high tower. Determine the angle of elevation of the top of the tower form the eye of the observer. *[CBSE 2017]*

Q.22 On a straight line passing through the foot of a tower, two points C and D are at distances of 4 m and 16 m from the foot respectively. If the angles of elevation from C and D of the top of the tower are complementary, then find the height of the tower. *[CBSE(AI) 2017]*

Q.23 From the top of a 120 m high tower, a man observes two cars on the opposite sides of the tower and in straight line with the base of tower with angles of depression as 60° and 45°. Find the distance between the two cars. (Take $\sqrt{3}$ = 1.732) *[CBSE 2017]*

Q.24 As observed from the top of a 100 m high light house from the sea-level, the angles of depression of two ships are 30° and 45°. If one ship is exactly behind the other on the same side of the light house, find the distance between the two ships. [Use $\sqrt{3}$ = 1.732] *[CBSE 2018]*

Q.25 The angle of elevation of the top of a hill at the foot of a tower is 60° and the angle of depression from the top of tower to the foot of hill is 30°. If tower is 50 metre high, find the height of the hill. *[CBSE 2018]*

Q.26 Two poles of equal heights are standing opposite to each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of evevation of the top of the poles are 60° and 30°, respectively. Find the height of the poles and the distances of the point from the poles. *[CBSE 2019]*

Q.27 A boy standing on a horizontal plane. Finds a bird flying at a distance of 100 m from him at an elevation of 30°. A girl standing on the roof of 20 metre high building, finds the angle of elevation of the same bird to be 45°. Both the boy and the girl are on opposite sides of the bird. Find the distance of bird from the girl.

[Given $\sqrt{2}$ = 1.414] *[CBSE 2019]*

Q.28 A man in a boat rowing away from a light house 100 m high takes 2 minutes to change the angle of elevation of the top of the light house from 60° to 30°. Find the speed of the boat in metres per minute.

[Use $\sqrt{3}$ =1.732] *[CBSE 2019]*

Q.29 Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30° respectively. Find the height of the poles and the distances of the point from the poles. *[CBSE 2019]*

Q.30 Amit, standing on a horizontal plane, finds a bird flying at a distance of 200 m from him at an elevation of 30°. Deepak standing on the roof of a 50 m high building, finds the angle of elevation of the same bird to be 45° Amit and Deepak are on opposite sides of the bird. Find the distance of the bird from Deepak. [*CBSE 2019*]

Q.31 The shadow of a tower standing on a level ground to be 40 m longer when the Sun's altitude is 30° than when it was 60°. Find the height of the tower.

[Given $\sqrt{3} = 1.732$] [*CBSE 2019*]

Q.32 A moving boat is observed from the top of a 150 m high cliff moving away from the cliff. The angle of depression of the boat changes from 60° to 45° in 2 minutes. Find the speed of the boat in m/min. [*CBSE 2019*]

Q.33 There are two poles, one each on either bank of a river just opposite to each other. One pole is 60 m high. From the top of this pole, the anlge of depression of the top and foot of the other pole are 30° and 60° respectively. Find the width of the river and height of the other pole. [*CBSE 2019*]

Q.34 A boy standing on a horizontal plane finds a bird flying at a distance of 100 m from him at an elevation of 30°. A gril standing on the roof of a 20 m high building, finds the elevation of the same bird to be 45°. The boy and the girl are on the opposite sides of the bird. Find the distance of the bird from the girl.

[Use $\sqrt{2} = 1.414$] [*CBSE 2019*]

Q.35 The angle of elevation of a aeroplane from a point A on the ground is 60°. After a flight of 30 seconds, the angle of elevation changes to 30°. If the aeroplane is flying at a constant height of $3600\sqrt{3}$ metres then find the speed of the aeroplane. [*CBSE 2019*]

Q.36 The ratio of the length of a vertical rod and the length of its shadow is $1 : \sqrt{3}$. Find the angle of elevation of the sun at that moment. [*CBSE 2020*]

Q.37 In the flight of 600 km, a naircraft was slowed due to bad weather. Its averge speed for the trip was reduced by 200 km/h and time of flight increased by 30 minutes. Find the original duration of flight. [*CBSE 2020*]

Q.38 A vertical tower stands on a horizontal plane and is surmounted by a vertical flag-staff of height 6 m. At a point on the plane, the angle of elevation of the bottom and top of the flag-staff are 30° and 45° respectively. Find the height of the tower. (Take $\sqrt{3} = 1.73$) [*CBSE 2020*]

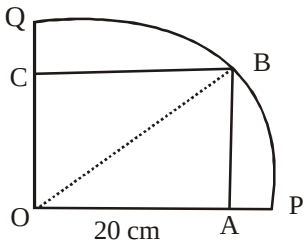
Q.39 A ladder 10 m long reaches a window 8m above the ground. The distance of the foot of the ladder from the base of the wall is ..... m. [*CBSE 2020*]

Q.40 From the top of a 7 m high building the angle of elevation of the top of a tower is 60° and the angle of depression of its foot is 45°. Determine the height of the tower. [*CBSE 2020*]

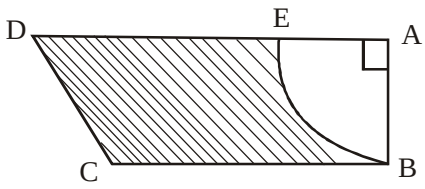
12 CHAPTER

Areas Related to Circles

Q.1 In fig. a square OABC is inscribed in a quadrant OPBQ. If OA = 20 cm, find the area of the shaded region. [Use $\alpha = 3.14$] *[CBSE 2014]*

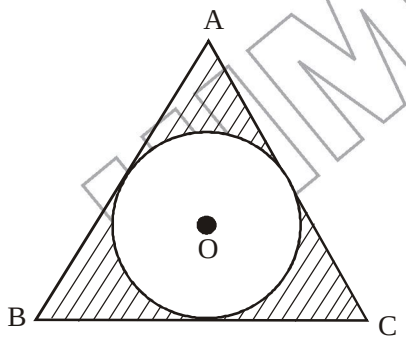


Q.2 In fig. ABCD is a trapezium of area 24.5 sq.cm. In it, AD || BC, ∠DAB = 90°, AD = 10 cm and BC = 4cm. If ABE is a quadrant of a circle, find the area of the shaded region. $\left[\text{Take } \pi = \frac{22}{7}\right]$ *[CBSE(AI) 2014]*

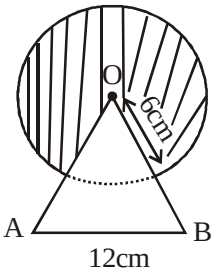


Q.3 In fig. a circle is inscribed in an equilateral triangle ABC of side 12 cm. Find the radius of inscribed circle and the area of the shaded region.

(Use π =3.14 and = $\sqrt{3}$ = 1.73) *[CBSE 2014]*

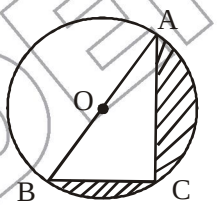


Q.4 Find the area of the shaded region in Fig. where a circular are of radius 6 cm has been drawn with vertex O of an equilateral triangle OAB of side 12 cm as centre.

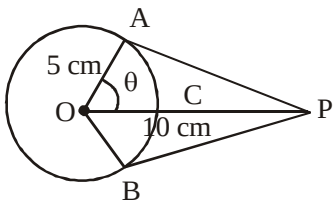


[CBSE 2016]

Q.5 In fig. O is the centre of a circle such that diameter AB=13 cm and AC = 12 cm, BC is joined. Find the area of the shaded region. (Take π = 3.14) *[CBSE (AI)2016]*

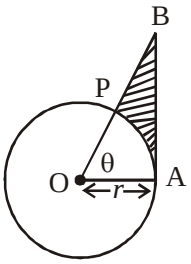


Q.6 An elastic belt is placed around the rim of a pulley of radius 5 cm. From one point C on the belt, the elastic belt is pulledectly away from the centre O of the pulley until it is at P, 10 cm from the point O. Find the length of the belt that is still in contact with the pulley. Also find the shaded area. (Use π = 3.14 and $\sqrt{3}$ = 1.73)

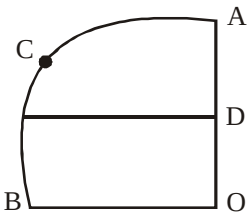


[CBSE 2016]

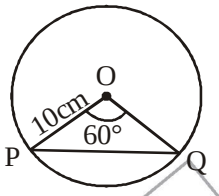
Q.7 In fig. a sector OAP of a circle with centre O, containing angle θ. AB is perpendicular to the radius OA and meets OP produced at B. Prove that the perimeter of shaded region is $r\left[\tan\theta+\sec\theta+\frac{\pi\theta}{180°}-1\right]$ [*CBSE 2016*]



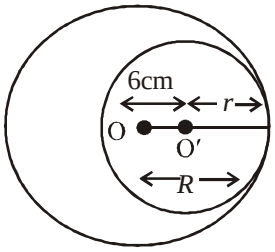
Q.8 In the given figure, OACB is a quadrant a circle with centre O and radius 3.5 cm. If OD = 2cm, find the area of the shaded region. [*CBSE 2017*]



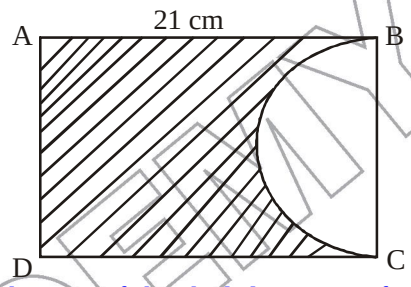
Q.9 A chord PQ of a circle of radius 10 cm subtends an angle of 60° at the centre of circle. Find the area of major and minor segments of the circle. [*CBSE 2017*]



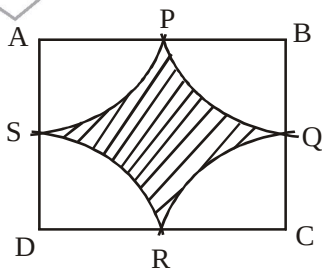
Q.10 Two circles touch internally. The sum of their areas is 116 π cm^2 and distance between their centres is 6cm. Find the radii of the circles. [*CBSE 2017*]



Q.11 In the given fig., ABCD is a rectangle of dimensions 21 cm × 14 cm. A semicircle is drawn with BC as diameter. Find the area and the perimeter of the shaded region in the figure. [*CBSE(Al) 2017*]



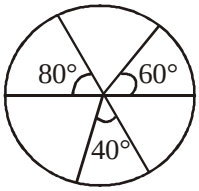
Q.12 Find the area of the shaded region in fig. where arcs drawn with centres A, B, C and D intersect in pairs at mid-points P, Q, R and S of the sides AB, BC, CD and DA respectively of a square ABCD of side 12 cm. [Use π = 3.14] [*CBSE 2018*]



Q.13 The short and long hands of a clock are 4 cm and 6 cm long respectively. Find the sum of distances travelled by their tips in 48 hours. [*CBSE 2018*]

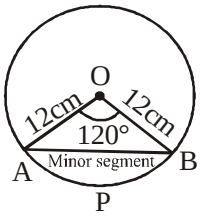
Q.14 The side of a square is 10 cm. Find the area between inscribed and circumscribed circles of the square. [*CBSE 2018*]

Q.15 In the figure, three section of a circle of radius 7 cm, making angles of 60°, 80° and 40° at the centre are shaded. Find the area of the shaded region.



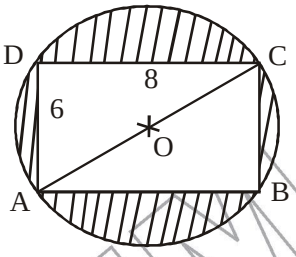
[*CBSE 2019*]

Q.16 Find the area of the segment shown in figure if radius of the circle is 21 cm and ∠AOB = 120°

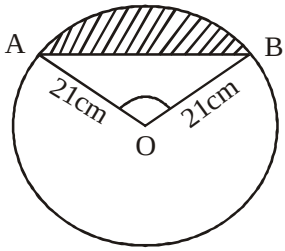


[*CBSE 2019*]

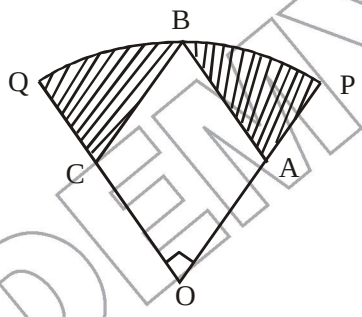
Q.17 Find the area of the shaded region in fig., if ABCD is a rectangle with sides 8 cm and 6 cm and O is the centre of circle. (Take π = 3.14) [*CBSE 2019*]



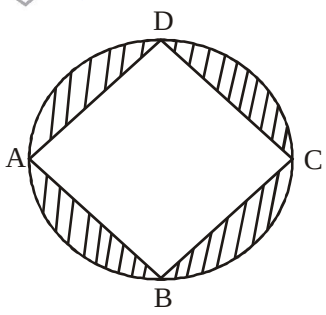
Q.18 Find the area of the segment shown in fig. if radius of the circle is 21 cm and ∠AOB = 120° $\left(\text{Use } \pi = \frac{22}{7}\right)$ [*CBSE 2019*]



Q.19 In fig. a square OABC is inscribed in a quadrant OPBQ. If OA = 15 cm, find the area of the shaded region. (Use π = 3.14) [*CBSE 2019*]



Q.20 In fig. ABCD is a square with side $2\sqrt{2}$ cm and inscribed in a circle. Find the area of the shaded region. (Use π = 3.14) [*CBSE 2019*]

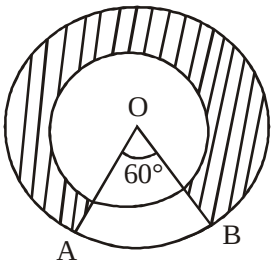


Q.21 A car has two wipers which do not overlap. Each wiper has a blade of length 21 cm sweeping through an angle 120°. Find the total area cleaned at each sweep of the blades. $\left(\text{Take } \pi = \frac{22}{7}\right)$ *[CBSE 2019]*

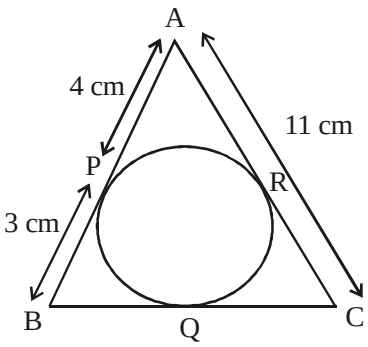
Q.22 A chord of a circle of radius 14 cm subtends an angle 60° at the centre. Find the area of the corresponding minor segment of the circle.

$\left(\text{Use } \pi = \frac{22}{7} \text{ and } \sqrt{3} = 1.73\right)$ *[CBSE 2019]*

Q.23 In fig., two concentric circles with centre O, have radii 21 cm and 42 cm. If ∠AOB = 60°, find the area of the shaded region. *[CBSE 2019]*



Q.24 In fig. ΔABC is circumscribing a circle, the length of BC is ..... cm.



[CBSE 2020]

Q.25 The perimeter of a sector of a circle of radius 5.2 cm is 16.4 cm. Find the area of the sector. *[CBSE 2020]*

Q.26 Prove that the parallelogram circumscribing a circle is a rhombus. *[CBSE 2020]*

13 CHAPTER

Surface Areas and Volumes

Q.1 The radii of the ends of a frustum of a cone 40 cm high are 20 cm and 11 cm. Find its slant height. *[CBSE 2014]*

Q.2 If the total surface area of a solid hemisphere is 462 cm^2, find its volume. $\left[\text{Take } \pi = \frac{22}{7}\right]$ *[CBSE(Al)2014]*

Q.3 A farmer connect a pipe of internal diameter 20 cm from a canal into a cylindrical tank which is 10 m in diameter and 2 m deep. If the water flows through the pipe at the rate of 4 km per hour, in how much time will the tank be filled completely ? *[CBSE 2014]*

Q.4 From a solid cylinder of height 2.8 cm and diameter 4.2 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid. $\left(\text{Use } \pi = \frac{22}{7}\right)$ *[CBSE 2014]*

Q.5 A container open at top, is in the form of a frustum of a cone of height 24 cm with radii of its lower and upper circular ends as 8 cm and 20 cm respectively. Find the cost of milk which can completely fill the container at the rate ` . 21 per litre. $\left(\text{Use } \pi = \frac{22}{7}\right)$ *[CBSE(Al) 2014]*

Q.6 A metallic bucket, open at the top, of height 24 cm is in the form of the frustum of a cone, the radii of whose lower and upper circular ends are 7 cm and 14 cm respectively. Find :

(i) the volume of water which can completely fill the bucket.

(ii) the eara of the metal sheet used to make the bucket.

$\left(\text{Use } \pi = \frac{22}{7}\right)$ *[CBSE 2014]*

Q.7 A solid metallic right circular cone 20 cm high and whose vertical angle is 60°, is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter $\frac{1}{12}$ cm, find the length of the wire. *[CBSE 2014]*

Q.8 A container open at the top, is in the form of a frustum of a cone of height 24 cm with radii of its lower and upper circular ends as 8 cm and 20 cm respectively. Find the cost of milk which can completely fill the container at the rate of ` . 21 per litre. $\left(\text{Use } \pi = \frac{22}{7}\right)$ *[CBSE (Al)2014]*

Or

A metallic bucket, open at the top, of height 24 cm is in the form of the frustum of a cone, the radii of whose lower and upper circular ends are 7 cm and 14 cm respectively. Find :

(i) the volume of water which can completely fill the bucket.

(ii) the area of the metal sheet used to make the bucket.

$\left(\text{Use } \pi = \frac{22}{7}\right)$ *[CBSE 2014]*

Q.9 A girl empties a cylindrical bucket, full of sand, of base radius 18 cm and height 32 cm, on the floor to form a conical heap of sand. If the height of this conical heap is 24 cm, then find its slant height correct up to one place of decimal. *[CBSE 2014,2019]*

Q.10 Two spheres of same metal weight 1 kg and 7 kg. The radius of the smaller sphere is 3 cm. The two spheres are melted to form a single big sphere. Find the diameter of the new sphere. *[CBSE 2015]*

Q.11 A hemispherical bowl of internal diameter 36 cm contains liquid. This liquid is filled into 72 cylindrical bottles of diameter 6 cm. Find the height of the each bottle, if 10% liquid is wasted in this transfer. [*CBSE(Al)2015*]

Q.12 A well of diameter 4 m is dug 14 m deep. The earth taken out is spread evenly all around the well to form a 40 cm high embankment. Find the width of the embankment. [*CBSE 2015*]

Q.13 A vessel full of water is in the form of an inverted cone of height 8 cm and the radius of its top, which is open, is 5 cm. 100 spherial lead balls are dropped into the vessel. One-fourth of the water flows out of the vessel. Find the radius of a spherical ball. [*CBSE 2015*]

Q.14 A hemispherical tank, of diameter 3 m, is full of water. It is being emptied by a pipe at the rate of $3\frac{4}{7}$ litre per second. How much time will it take to make the tank half empty ? $\left(\text{Use } \pi = \frac{22}{7}\right)$ [*CBSE 2016*]

Q.15 A cylindrical tub, whose diameter is 12 cm and height 15 cm is full of ice cream. The whole ice-cream is to be divided into 10 children in equal ice-cream cones, with conical base surmounted by hemispherical top. If the height of conical portion is twice the diameter of base, find the diameter of conical part of ice-cream cone. [*CBSE 2016*]

Q.16 The sum of the radius of base and height of a solid right circular cylinder is 37cm. If the total surface area of the solid cylinder is 1628 sq. cm find the volume of the cylinder. $\left(\text{Use } \pi = \frac{22}{7}\right)$ [*CBSE 2016*]

Q.17 A sphere of diameter 12 cm, is dropped in a right circular cylindrical vessel, partly filled with water. If the sphere is completely submerged in water, the water level in the cylindrical vessel rises by $3\frac{5}{9}$ cm. Find the diameter of the cylindrical vessel. [*CBSE(Al) 2016*]

Q.18 The height of the cone is 30 cm. A small cone is cut off at the top by a plane parallel to the base. If its volume be $\frac{1}{27}$ of the given cone, at what height above the base is the section made ? [*CBSE 2016*]

Or

The height of a cone is 30 cm. Form its topside a small cone is cut by a plane parallel to its base. If volume of smaller cone is $\frac{1}{27}$ of the given cone, then at what height it is cut from its base ? [*CBSE 2017*]

Q.19 A metal container, open from the top, is in the shape of a frustum of a cone of height 21 cm with radii of its lower and upper circular ends as 8 cm and 20 cm respectively. Find the cost of milk which can completely fill the container at the rate of ` 35. per litre.

$\left(\text{Take } \pi = \frac{22}{7}\right)$ [*CBSE 2016*]

Q.20 A bucket open at the top is in the form of a frustum of a cone with a capacity of 12308.8 cm^3. The radii of the top and bottom circular ends are 20 cm and 12 cm respectively. Find the height of the bucket and the area of metal sheet used in making the bucket.

(Use $\pi = 3.14$) [*CBSE 2016*]

Q.21 A well of diameter 4 m is dug 21 m deep. The earth out of it has been spread evenly all around it in the shape of a circular ring of width 3 m to form an embankment. Find the height of the embankment. [*CBSE 2016*]

Q.22 A solid metallic cuboid of dimensions 9 m × 8 m × 2m is melted and recast into solid cubes of edge 2m. Find the number of cubes so formed. [*CBSE 2017*]

Q.23 Volume and surface area of a solid hemisphere are numerically equal. What is the diameter of hemisphere? [*CBSE 2017*]

Q.24 The slant height of a frustum of a cone is 4 cm and the perimeters (circumference) of its circular ends are 18 cm and 6 cm. Find the curved surface area of the frustum. [*CBSE (Al)2017*]

Q.25 The dimensions of a solid iron cuboid are 4.4 m × 2.6m × 1.0 m. It is melted and recast into a hollow cylindrical pipe of 30 cm inner radius and thickness 5 cm. Find the length of the pipe. [*CBSE (Al) 2017*]

Q.26 A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius on its circular face. The total height of the toy is 15.5 cm. Find the total surface area of the toy. [*CBSE(Al) 2017*]

Q.27 Water is flowing at the rate of 5 km/hour through a pipe of diameter 14 cm into a rectangular tank of dimensions 50 m × 44 m. Find the time in which the level of water in the tank will rise by 7 cm. [*CBSE 2017*]

Q.28 The radius and height of a solid right circular cone are in the ratio of 5 : 12. If its volume is 314 cm^3, find its total surface area.(Take $\pi = 3.14$) [*CBSE 2017*]

Q.29 A wire of diameter 3 mm is wound about a cylinder whose height is 12 cm and radius 5 cm so as to cover the curved surface of the cylinder completely. Find the length of the wire. [*CBSE 2017*]

Q.30 From a solid right circular cylinder of height 2.4 cm and radius 0.7 cm, a right circular cone of same height and same radius is cut out. Find the total surface area of the remaining solid. [*CBSE (Al)2017*]

Q.31 A metallic right circular cone 20 cm high whose vertical angle is 60° what is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter $\frac{1}{16}$ cm, find the length of the wire. [*CBSE 2017*]

Q.32 A hollow cone is cut by a plane parallel to the base at some height and the upper portion is removed. If the curved surface area of the remainder is $\frac{8}{9}$ of the curved surface of the whole cone, find the ratio of the two parts into which the cone's altitude is divided. [*CBSE 2017*]

Q.33 A right circular cone is divided into three parts by trisecting its height by two planes drawn parallel to the base. Show that the volumes of the three portions starting from the top are in the ratio 1 : 7 : 19. [*CBSE 2017*]

Q.34 From a solid cylinder whose height is 24 cm and diameter 20cm, a conical cavity of same height and same diameter is hollowed out. Find the total surface area of the remaining solid. [*CBSE 2017*]

Q.35 A solid metallic sphere of diameter 16 cm is melted and recast into a number of smaller cones, each of radius 4 cm and height 8 cm. Find the number of cones so formed. [*CBSE 2017*]

Q.36 A metallic solid sphere of radius 10.5 cm is melted and recasted into smaller solid cones, each of radius 3.5 cm and height 3 cm. How many cones will be made? [*CBSE 2017*]

Q.37 A solid sphere of diameter 6 cm is dropped in a right circular cylindrical vessel partly filled with water. The diameter of the cylindrical vessel is 12cm. If the sphere is completely submerged in water, by how much will the level of water rise in the cylindrical vessel ? [*CBSE 2017*]

Q.38 A well of diameter 3 m is dug 14 m deep. The soil taken out of it is spread evenly all around it to a width of 5 m to form an embankment. Find the height of the embankment. [*CBSE 2017*]

Q.39 The height of a cone is 10 cm. The cone is divided into two parts using a plane parallel to its base at the middle of its height. Find the ratio of the volumes of the two parts. [*CBSE 2017*]

Q.40 Water in a canal, 5.4 m wide and 1.8 m deep, is flowing with a speed of 25 km/ hour. How much area can it irrigate in 40 minutes, if 10 cm of standing water is required for irrigation ? [*CBSE(Al) 2017*]

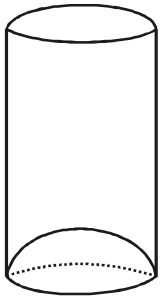
Q.41 The diameters of the lower and upper ends of a bucket in the form of a frustum of a cone are 10 cm and 30cm respectively. If its height is 24 cm, find :

(i) The area of the metal sheet used to make the bucket.

(ii) Why we should avoid the bucket made by ordinary plastic ? (Use $\pi = 3.14$) [*CBSE 2018*]

Q.42 A man donates 10 aluminum buckets to an orphanage. A bucket made of aluminum is of height 20 cm and has its upper and lowest ends of radius 36 cm and 21 cm respectively. Find the cost of preparing 10 buckets if the cost of aluminum sheet is ` 42 per 100 cm^2. Write your comments on the act of the man. [*CBSE 2018*]

Q.43 A juice seller was serving his customers using glasses as shown in fig. The inner diameter of the cylindrical glass was 5 cm, but the bottom of the glass had a hemispherical raised portion which reduced the capacity of the glass. If the height of a glass was 10 cm, find the apparent capacity of the glass and its actual capacity. (Use $\pi = 3.14$) [*CBSE 2019*]



Q.44 A bucket open at the top is in the form of a frustum of a cone with a capacity of 12308.8 cm^3. The raddii of the top and bottom of circular ends of the bucket are 20 cm and 12 cm respectively. Find the height of the bucket and also the area of the metal sheet used in making it. (Use $\pi = 3.14$) [*CBSE 2019*]

Q.45 An open metallic bucket is in the shape of a frustum of a cone. If the diameters of the two circular ends of a bucket are 45 cm and 25 cm and the vertical height of the bucket is 24 cm, find the area of the metallic sheet used to make the bucket. Also find the volume of the water it can hold. $\left(\text{Use } \pi = \frac{22}{7}\right)$ [*CBSE 2019*]

Q.46 Water in a canal, 6 m wide and 1.5 m deep, is flowing with a speed of 10 km/h. How much area will it irrigate in 30 minutes, if 8 cm of standing water is needed ? [*CBSE 2019*]

Q.47 A right circular cylinder and a cone have equal bases and equal heights. If their curved surface areas are in the ratio 8 : 5, show that the ratio between radius of their bases to their height is 3 : 4. [*CBSE 2019*]

Q.48 A solid is in the form of a cylinder with hemispherical ends. The total height of the solid is 20 cm and the diameter of the cylinder is 7 cm. Find the total volume of the solid. $\left(\text{Use } \pi = \frac{22}{7}\right)$ [*CBSE 2019*]

Q.49 Two spheres of same metal weigh 1 kg and 7 kg. The radius of the smaller sphere is 3 cm. The two spheres are melted to form a single big sphere. Find the diameter of the new sphere. [*CBSE 2019*]

Q.50 A cone of height 24 cm and radius of base 6 cm is made up of modelling clay. A child reshapes it in the form of a sphere. Find the radius of the sphere and hence find the surface area of this sphere. [*CBSE 2019*]

Q.51 A farmer connects a pipe of internal diameter 20 cm from a canal into a cylindrical tank in his field which is 10 m in diameter and 2 m deep. If water flows through the pipe at the rate of 3 km/hr, in how much time will the tank be filled ? [*CBSE 2019*]

Q.52 A hemispherical tank full of water is emptied by a pipe at the rate of $3\frac{4}{7}$ litres per second. How much time will it take to empty the tank, if it is 3 m in diameter ?

$\left(\text{Take } \pi = \frac{22}{7}\right)$ [*CBSE 2019*]

Q.53 A solid iron pole consists of a cylinder of height 220 cm and base diameter 24 cm, which is surmounted by another cylinder of height 60 cm and radius 8 cm. Find the mass of the pole, given that 1 cm^3 of iron has approximately 8 gm mass. (Use π = 3.14) [*CBSE 2019*]

Q.54 A right cylindrical container of radius 6 cm and height 15 cm is full of ice-cream, which has to be distributed to 10 children in equal cones having hemispherical shape on the top. If the height of the conical portion is four times its base radius, find the radius of the ice-cream cone. [*CBSE 2019*]

Q.55 A blucket open at the top is in the form of a frustum of a cone with a capacity of 12308.8 cm^3. The radii of the top and bottom circular ends are 20 cm and 12 cm respectively. Find the height of the bucket and the area of metal sheet used in making the bucket.
(Use π = 3.14) [*CBSE 2019*]

Q.56 A container opened at the top and made up of a metal sheet, is in the form of a frustum of a cone of height 15 cm with radii of its lower and upper ends as 8 cm and 20cm respectively. Find the cost of milk which can completely fill the container, at the rate of ` 50 per litre. Also find the cost of metal sheet used to make the container, if container, it it costs ` 10 per 100 cm^2.
(Use π = 3.14) [*CBSE 2019*]

Q.57 The radii of the circular ends of the frustum of a cone of height 45 cm, are 28 cm and 7 cm. Find its volume and curved surface area. [*CBSE 2019*]

Q.58 A well of diameter 3m is dug 14 m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 4 m to from an embankment. Find the height of the embankment. [*CBSE 2019*]

Q.59 Two cones have their heights in the ratio 1 : 3 and radii in the ratio 3 : 1. What is the ratio of their volumes ? [*CBSE 2020*]

Q.60 A cone of base radius 4 cm is divided into two parts by drawing a plane through the mid-point of its height and parallel to its base. Compare the volume of the two parts. [*CBSE 2020*]

Q.61 A bucket is in the form of a frustum of a cone of height 30 cm with radii of its lower and upper ends as 10 cm and 20 cm, respectively. Find the capacity of the bucket. Also find the cost of milk which can completely fill the bucket at the rate of `40 per litre . $\left[\text{Use } \pi = \frac{22}{7}\right]$ [*CBSE 2020*]

Q.62 A bucket in the form of a frustum of a cone of height 16 cm with radii of its lower and upper circular ends as 8 cm and 20 cm respectively. Find the cost of milk which can completely fill the bucket, at the rate `40 per litre. (Use π = 3.14) [*CBSE 2020*]

14 CHAPTER

Statistics

Q.1 The table below shows the salaries of 280 persons : [*CBSE 2018*]

Salary (In thousand `)	Number of Persons
5-10	49
10-15	133
15-20	63
20-25	15
25-30	6
30-35	7
35-40	4
40-45	2
45-50	1

Calculate the median salary of the data.

Q.2 By changing the following frequency distribution 'to less than type' distribution, draw its ogive.

Classes	0-15	15-30	30-45	45-60	60-75
Frequency	6	8	10	6	4

[*CBSE 2018*]

Q.3 The mean of the following distribution is 18. Find the frequency f of the class 19-21.

Classes	11-13	13-15	15-17	17-19	19-21	21-23	23-25
Frequency	3	6	9	13	f	5	4

[*CBSE 2018*]

Q.4 The following distribution gives the daily income of 50 workers of a factory. [*CBSE 2018*]

Daily Income (in `)	100-120	120-140	140-160	160-180	180-200
Number of Workers	12	14	8	6	10

Convert the distribution above to a less than type cumulative frequency distribution and draw its ogive.

Q.5 Find the mean and mode for the following data :

Classes	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	4	8	10	12	10	4	2

[*CBSE 2018*]

Q.6 Find the mode of the following frequency distribution.

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	8	10	10	16	12	6	7

[*CBSE 2019*]

Q.7 The following table gives the number of participants in a yoga camp.

Age (in years)	20-30	30-40	40-50	50-60	60-70
No. of participants	8	40	58	90	83

Find the modal age of the participants. [*CBSE 2019*]

Q.8 The arithmetic mean of the following frequency distribution is 53. Find the value of k.

Class	0-20	20-40	40-60	60-80	80-100
Frequency	12	15	32	k	13

[*CBSE 2019*]

Q.9 For the following frequency distribution, draw a cumulative frequency curve (ogive) of 'more than type' and hence obtain the median value. [*CBSE 2019*]

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	5	15	20	23	17	11	9

Q.10 Find the value of frequencies x and y in the following frequency distribution table, if N = 100 and median is 32.

Mark	0-10	10-20	20-30	30-40	40-50	50-60	Total
No. of students	10	x	25	30	y	10	100

[*CBSE 2019*]

Q.11 A class teacher has the following absentee record of 40 students of a class for the whole term. Find the mean number of days a student was absent.

No. of days	0-6	6-12	12-18	18-24	24-30	30-36	36-42
No. of students	10	11	7	4	4	3	1

[*CBSE 2019*]

Q.12 The weights of tea in 70 packets is given in the following table

Weight (In g.)	Number of Packets
200-201	12
201-202	26
202-203	20
203-204	9
204-205	2
205-206	1

Find the modal weight. [*CBSE 2019*]

Q.13 If the median of the following frequency distribution is 32.5. Find the values of f_1 and f_2. [*CBSE 2019*]

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	Total
Frequency	f_1	5	9	12	f_2	3	2	40

Q.14 The following distribution gives the daily income of 50 workers of a factory. [*CBSE 2019*]

Daily income (in `)	200-220	220-240	240-250	260-280	280-300
No. of workers	12	14	8	6	10

Convert the distrinution above to a 'less than type' cumulative frequency distribution and draw its ogive.

Q.15 Change the following data into 'less than type' distribution and draw its ogive. [*CBSE 2019*]

Class Interval	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	7	5	8	10	6	6	8

Q.16 Change the following distribution to a 'more than type' distribution. Hence draw the 'more than type' ogive for this distribution. [*CBSE 2019*]

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

Q.17 Calculate the mean of the following frequency distribution [*CBSE 2019*]

Class	10-30	30-50	50-70	70-90	90-110	110-130
Frequency	5	8	12	20	3	2

Q.18 The following table gives production yield in kg per hectare of wheat of 100 farms of a village [*CBSE 2019*]

Production yield (kg. hectare)	40-45	45-50	50-55	55-60	60-65	65-70
Number of farms	4	6	16	20	30	24

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

Q.19 If the mean of the following frequency distribution is 62.8, then find the missing frequency x [*CBSE 2019*]

Class	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	5	8	x	12	7	8

Q.20 Find the mean of the following distribution

Class	3-5	5-7	7-9	9-11	11-13
Frequency	5	10	10	7	8

[*CBSE 2020*]

Q.21 Find the mode of the following data

Class	0-20	20-40	40-60	60-80	80-100	100-120	120-140
Frequency	6	8	10	12	6	5	3

[*CBSE 2020*]

Q.22 The following table gives production yield per hectare (in quintals) of wheat of 100 farms of a village :

Production yield/hect	40-45	45-50	50-55	55-60	60-65	65-70
No. of farms	4	6	16	20	30	24

Change the distribution to 'a more than' type distribution and draw its ogive. *[CBSE 2020]*

Q.23 The median of the following data is 525. Find the values of x and y, if total frequency is 100 :

Class	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

[CBSE 2020]

15 CHAPTER Probability

Q.1 Rahim tosses two different coins simultaneously. Find the probability of getting at least one tail. *[CBSE 2014]*

Q.2 All the black face cards are removed from a pack of 52 playing cards. The remaining cards are well shuffled and then a card is drawn at random. Find the probability of getting a :

(i) face card (ii) red card

(iii) black card (iv) king *[CBSE 2014]*

Q.3 Cards numbered from 11 to 60 are kept in a box. If a card is drawn at random from the box, find the probability that the number on the drawn card is

(i) an odd number

(ii) a perfect square number

(iii) divisible by 5

(iv) a prime number less than 20 *[CBSE 2014]*

Q.4 Two different dice are rolled simultaneously. Find the probability that the sum of numbers appearing on the two dice is 10. *[CBSE 2014]*

Q.5 Two different dice are tossed together. Find the probability :

(i) that the number on each die is even.

(ii) that the sum of numbers appearing on the two dice is 5. *[CBSE (Al)2014]*

Q.6 Red queens and black jacks are removed from a pack of 52 playing cards. A card is drawn at random from the remaining cards, after reshuffling them. Find the probability that the drawn card is :

(i) a king (ii) of red colour

(iii) a face card (iv) a queen *[CBSE 2014]*

Q.7 Cards numbered 1 to 30 are put in a bag. A card is drawn at random from this bag. Find the probability that the number on the drawn card is :

(i) not divisible by 3

(ii) a prime number greater than 7

(iii) not a perfect square number *[CBSE 2014]*

Q.8 A dice is rolled twice. Find the probability that

(i) 5 will not come up either time.

(ii) 5 will come up exactly one time. [*CBSE 2014*]

Q.9 A bag contains cards numbered from 1 to 49. A card is drawn from the bag at random, after mixing the cards throughly. Find the probability that the number on the drawn card is :

(i) and odd number (ii) a multiple of 5

(iii) an even prime number

(iv) a profect square. [*CBSE 2014*]

Or

Cards market with numbers 5 to 50 (one number on one card) are placed in a box and mixed throughly. One card is drawn at random from the box. Find the probability that the number on the card taken out is

(i) a prime number less than 10

(ii) a number which is a perfect square. [*CBSE 2019*]

Q.10 Cards market with number 3,4,5,....., 50 are placed in a box and mixed thoroughly. A card is drawn at random from the box. Find the probability that the selected card bears a perfect square number. [*CBSE 2016*]

Q.11 A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of getting neigher a red card nor a queen. [*CBSE(Al)2016*]

Q.12 20 tickets, on which numbers 1 to 20 are written, are mixed thoroughly and then a ticket is drawn at random out of them. Find the probability that the number on the drawn ticket is a multiple of 3 or 7. [*CBSE 2016*]

Q.13 Three unbiased coins are tossed together. Find the probability of getting.

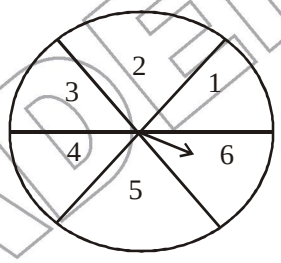
(i) all heads (ii) exactly two heads

(iii) exactly one head (iv) at least two heads

(v) at least two tails [*CBSE 2016*]

Q.14 A number x is selected at random from the numbers 1, 2, 3 and 4. Another number y is selected at random from the numbers 1, 4, 9 and 16. Find the probability that product of x and y is less than 16. [*CBSE (Al)2016*]

Q.15 In fig., shown a disc on which a player spins an arrow twice. The function $\frac{a}{b}$ is formed, where 'a' is the number of sector on which arrow stops on the first spin and 'b' is the number of the sector in which the arrow stops on second spin. On each spin, each sector has equal chance of selection by the arrow. Find the probability that the fraction $\frac{a}{b} > 1$.



[*CBSE 2016*]

Q.16 A game consists of tossing a one-rupee coin 3 times and noting the outcome each time. Ramesh wins the game if all the tosses give the same result(i.e., three heads or three tails) and loses otherwise. Find the probability of Ramesh losing the game. [*CBSE 2016, 2017*]

Or

A game consists of tossing a coin 3 times and noting the outcome each time. If getting the same result in all the tosses is a success, find the probability of losing the game. [*CBSE 2019*]

Q.17 A number is chosen at random from the numbers –3, –2, –1, 0,1, 2, 3. What will be the probability that square of this number is less than or equal to 1 ? [*CBSE 2017*]

Q.18 Two different dice are thrown together. Find the probability that the numbers obtained

(i) have a sum less than 7

(ii) have a product less than 16

(iii) is a doublet of odd numbers [*CBSE 2017*]

Q.19 Two different dice are thrown together. Find the probability that the numbers obtained have

(i) even sum (ii) even product [*CBSE (AI)2017*]

Q.20 Find the probability that in a leap year there will be 53 Tusesdays. [*CBSE 2017*]

Q.21 The probability of selecting a rotten apple randomly from a heap of 900 apples is 0.18. What is the number of rotten apples in the heap ? [*CBSE (AI)2017*]

Q.22 A bag contains 3 red and 5 black balls. A ball is drawn at random from the bag. What is the probability that the drawn ball is not red ? [*CBSE 2017*]

Q.23 Two different dice are thrown together. Find the probability that the product of the numbers appeared is less than 18. [*CBSE 2017*]

Q.24 A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears (i) a two-digit number

(ii) a number divisible by 5. [*CBSE 2017*]

Q.25 Two different dice are tossed together. Find the probability:

(i) of getting a doublet

(ii) of getting a sum 10, of the numbers on the two dice. [*CBSE 2018*]

Q.26 An integer is chosen at random between 1 and 100. Find the probability that it is

(i) divisible by 8 (ii) not divisible by 8 [*CBSE 2018*]

Q.27 The King, Queen and Jack of clubs are removed from a pack of 52 cards and then the remaining cards are well shuffled. A card is selected from the remaining cards. Find the probability of getting a card

(i) of spade (ii) of black king

(iii) of club (iv) of jacks [*CBSE 2018*]

Q.28 A die is thrown once. Find the probability of getting

(i) a prime number

(ii) a number lying between 2 and 6

(iii) an odd number [*CBSE 2019*]

Q.29 The probability of selecting a blue marble at random from a jar that contains only blue, black and green marbles is $\frac{1}{5}$. The probability of selecting a black marble at random from the same jar is $\frac{1}{4}$. If the jar contains 11 green marbles, find the total number of marbles in the jar. [*CBSE 2019*]

Q.30 The dice is thrown once. Find the probability of getting (i) a composite number (ii) a prime number. [*CBSE 2019*]

Q.31 Cards numbered 7 to 40 were put in a box. Poonam select a card at random. What is the probability that Poonam select a card which is a multiple of 7 ? [*CBSE 2019*]

Q.32 A bag contains 15 balls, out of which some are white and the others are black. If the probability of drawing a black ball at random from the bag is $\frac{2}{3}$, then find how many white balls are there in the bag. [*CBSE 2019*]

Q.33 A card is drawn at random from a pack of 52 playing cards. Find the probablity of drawing a card which is neither a spade nor a king. [*CBSE 2019*]

Q.34 Three different coins are tossed simultaneously. Find the probability of getting exactly one head. [*CBSE 2019*]

Q.35 A die is thrown once. Find the probability of getting (a) a prime number (b) an odd number. (c) a number lying between 296 [*CBSE 2019*]

Q.36 A pair of dice is thrown once. Find the probability of getting (i) even number on each die (ii) a total of 9. [*CBSE 2019*]

Q.37 A bag contains some balls of which x are white, $2x$ are black and $3x$ are red. A ball is selected at random. What is the probability that it is (i) not red (ii) white [*CBSE 2019*]

Q.38 A letter of English alphabet is chosen at random. What is the probability that the chosen letter is a consonant? [*CBSE 2020*]

Q.39 A die is thrown once. What is the probability of getting a number less than 3 ? [*CBSE 2020*]

Q.40 If the probability of winning a game is 0.07, what is the probability of losing it ? [*CBSE 2020*]

Q.41 If a number x is chosen at random from the numbers $-3,-2,-1, 0, 1, 2, 3$. What is probability that $x^2 \le 4$? [*CBSE 2020*]

Q.42 A die is thrown once. What is the probability of getting an even prime number ? [*CBSE 2020*]

Q.43 A pair of dice is thrown once. What is the probability of getting a doublet ? [*CBSE 2020*]