

**CLASS –X**

**MATHEMATICS (CODE NO. 041)**

**SESSION 2018-19**

**RESOURCE MATERIAL FOR TEACHERS AND STUDENTS**

Resource material comprises the following key important aspects:

1. Chapter wise questions appeared in the previous ten years board papers have been compiled for ready reference of teacher and student. These questions will help both students and teachers to understand the level of questions given in the board examination and also, to identify the **MUST KNOW CONCEPTS** in each chapter.
2. Chapter wise concept Maps/ Mind Maps created by Students as part of their Subject Enrichment Activity. The concept maps enable the students to quickly recall the facts, formulae at one glance. Concept maps also help the students to see relationship between concepts and structure the ideas.
3. Hope this material will be useful and I believe that sharing of knowledge is the gateway to achieve immortality.

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**COURSE STRUCTURE CLASS –X**

**MATHEMATICS (CODE NO. 041)**

**SESSION 2018-19**

<b>UNIT</b>	<b>UNIT NAME</b>	<b>CHAPTER NAME</b>	<b>MARKS</b>
I	NUMBER SYSTEMS	REAL NUMBER	06
II	ALGEBRA	POLYNOMIALS	20
		PAIR OF LINEAR EQUATIONS IN TWO VARIABLES	
		QUADRATIC EQUATIONS	
		ARITHMETIC PROGRESSIONS	
III	COORDINATE GEOMETRY	COORDINATE GEOMETRY	06
IV	GEOMETRY	TRIANGLES	15
		CIRCLES	
		CONSTRUCTIONS	
V	TRIGONOMETRY	INTRODUCTION TO TRIGONOMETRY & IDENTITIES	12
		HEIGHTS AND DISTANCES	
VI	MENSURATION	AREAS RELATED TO CIRCLES	10
		SURFACE AREAS AND VOLUMES	
VII	STATISTICS & PROBABILITY	STATISTICS	11
		PROBABILITY	
<b>TOTAL MARKS</b>			<b>80</b>

**SOURCE:** CBSE CURRICULUM FOR THE ACADEMIC YEAR 2018-19

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## CLASS X: REAL NUMBERS

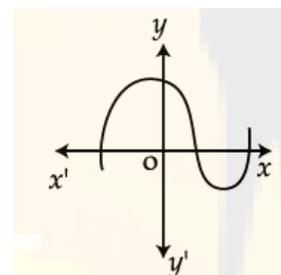
### (PREVIOUS YEARS BOARD QUESTION PAPERS)

1. What is the HCF of smallest prime number and the smallest composite number? **(CBSE 2018-1M)**
2. Write whether the rational number  $\frac{7}{75}$  will have a terminating decimal expansion or a non-terminating repeating decimal expansion. **(CBSE 2017-1M)**
3. State Euclid's Division Lemma. **(CBSE 2010-1M)**
4. Identify the rational number:  $5 - \sqrt{3}$ ,  $5 + \sqrt{3}$ ,  $4 + \sqrt{2}$ ,  $5 + \sqrt{9}$  **(CBSE 2010-1M)**
5. Has the rational number  $\frac{441}{2^2 \times 5^7 \times 7^2}$  a terminating or non terminating decimal expansion? **(CBSE 2010-1M)**
6. Has the rational number  $\frac{51}{1500}$  a terminating or non terminating decimal expansion? **(CBSE 2009-1M)**
7. Given that  $\sqrt{2}$  is irrational, prove that  $(5 + 3\sqrt{2})$  is an irrational number. **(CBSE 2018-2M)**
8. Check whether  $6^n$  can never end with 0 for any natural number n. **(CBSE 2010-2M)**
9. If two positive integers p and q are written as  $p=a^2b^3$  and  $q=a^3b$ ; a, b are prime numbers, then verify:  $\text{LCM}(p, q) \times \text{HCF}(p, q) = pq$ . **(CBSE 2017-2M)**
10. Find HCF and LCM of 404 and 96 and verify that  $\text{HCF} \times \text{LCM} = \text{Product of the two given numbers}$ . **(CBSE 2018-3M)**
11. Show that exactly one of the numbers n, n + 2 or n + 4 is divisible by 3. **(CBSE 2017-3M)**
12. An army contingent of 616 members is to march behind an army band of 32 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march? **(CBSE 2010-3M)**
13. Find HCF and LCM of 306 and 54 and verify that  $\text{HCF} \times \text{LCM} = \text{Product of the two given numbers}$ . **(CBSE 2010-3M)**
14. Prove that  $\frac{2\sqrt{3}}{5}$  is irrational number. **(CBSE 2010-3M)**
15. Show that the square of any positive odd integer is of the form  $8m + 1$ , for some integer m. **(CBSE 2009-3M)**
16. Prove that  $7 + 3\sqrt{2}$  is not a rational number. **(CBSE 2009-3M)**
17. Prove that  $2 - 3\sqrt{5}$  is irrational number. **(CBSE 2010-3M)**

## CLASS X: POLYNOMIALS

### (PREVIOUS YEARS BOARD QUESTION PAPERS)

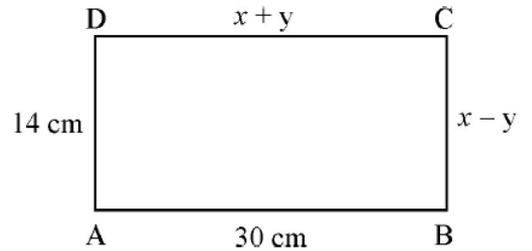
1. Find the number of zeroes of the polynomial given in the graph.  
**(CBSE 2010-1M)**
2. If 1 is zero of polynomial  $p(x)=ax^2-3(a-1)x-1$  then find the value of a.  
**(CBSE 2010-1M)**
3. If  $\alpha$  and  $\beta$  are zeroes of a polynomial such that  $\alpha + \beta = 6$  &  $\alpha\beta = 6$ , then write a polynomial. **(CBSE 2010-1M)**
4. Write the polynomial, the product and sum of whose zeroes are  $-\frac{9}{2}$  and  $-\frac{3}{2}$  respectively. **(CBSE 2009-1M)**
5. Find the zeroes of the quadratic polynomial  $\sqrt{3}x^2 - 8x + 4\sqrt{3}$ . **(CBSE 2010-2M)**
6. If two zeroes of polynomial  $x^3 - 4x^2 - 3x + 12$  are  $\sqrt{3}$  and  $-\sqrt{3}$ , then find its third zero. **(CBSE 2010-2M)**
7. Find all zeroes of the polynomial  $(2x^4 - 9x^3 + 5x^2 + 3x - 1)$  if two of its zeroes are  $(2 + \sqrt{3})$  and  $(2 - \sqrt{3})$ . **(CBSE 2018-3M)**
8. Find all the zeroes of the polynomial  $3x^4 + 6x^3 - 2x^2 - 10x - 5$  if two of its zeroes are  $\sqrt{\frac{5}{3}}$  &  $-\sqrt{\frac{5}{3}}$ . **(CBSE 2017-3M)**
9. On dividing  $x^3 - 3x^2 + x + 2$  by a polynomial  $g(x)$ , the quotient and remainder were  $x - 2$  and  $-2x + 4$  respectively. Find  $g(x)$ . **(CBSE 2010-3M)**
10. If the polynomial  $6x^4 + 8x^3 + 5x^2 + ax + b$  is exactly divisible by the polynomial  $2x^2 - 5$ , find the values of  $a$  and  $b$ . **(CBSE 2009-3M)**
11. If the polynomial  $x^4 - 6x^3 + 16x^2 - 25x + 10$  is divided by  $x^2 - 2x + k$ , the remainder is  $x + a$ . Find the values of  $k$  and  $a$ . **(CBSE 2010-4M)**



## CLASS X: LINEAR EQUATIONS IN TWO VARIABLES

### (PREVIOUS YEARS BOARD QUESTION PAPERS)

1. Write whether the following pair of linear equations is consistent or not:  $x+y=14$  &  $x-y=4$
2. In Fig. 1, ABCD is a rectangle. Find the values of  $x$  and  $y$ . **(CBSE 2018-2M)**



**Fig. – 1**

3. Find the value(s) of  $k$  for which the pair of linear equations  $kx + y = k^2$  and  $x + ky = 1$  have infinitely many solutions. **(CBSE 2017-2M)**
4. Find the value of  $p$  for which the following equations have unique solution.  $4x+py+8=0$ ,  $2x+2y+2=0$  **(CBSE 2010-2M)**
5. Find the value(s) of  $k$  for which the pair of linear equations  $2x + 3y = 7$  and  $(k-1)x + (k+2)y = 3k$  have infinitely many solutions. **(CBSE 2010-2M)**
6. Without drawing the graph, find out whether the lines representing the following pair of linear equations intersect at a point, are parallel or coincident:  $9x-10y=21$  &  $\frac{3}{2}x - \frac{5}{3}y = \frac{7}{2}$  **(CBSE 2009-2M)**
7. Seven times a two digit number is equal to four times the number obtained by reversing the order of its digits. If the difference of the digits is 3, determine the number. **(CBSE 2017-3M)**
8. Solve for  $x$  and  $y$ :  $\frac{5}{x-1} + \frac{1}{y-2} = 2$  &  $\frac{6}{x-1} - \frac{3}{y-2} = 1$  **(CBSE 2010-3M)**
9. Solve for  $x$  and  $y$ :  $\frac{4}{x} + 3y = 8$  &  $\frac{6}{x} - 4y = -5$  **(CBSE 2010-3M)**
10. For what values of  $a$  and  $b$  the following equations have infinite solutions.  $2x+3y=7$ ;  $a(x+y)-b(x-y)=3a+b-2$  **(CBSE 2010-3M)**
11. The sum of numerator and denominator of a fraction is three less than twice denominator. If each denominator and denominator is decreased by 1, the fraction becomes  $\frac{1}{2}$ . Find the fraction. **(CBSE 2010-3M)**
12. Solve the system of equations graphically. Also, find the points where the lines meet the  $x$ -axis.  $x+2y=5$ ;  $2x-3y=-4$  **(CBSE 2010-4M)**

## CLASS X: QUADRATIC EQUATIONS

### (PREVIOUS YEARS BOARD QUESTION PAPERS)

1. If  $x = 3$  is one root of the quadratic equation  $x^2 - 2kx - 6 = 0$ , then find the value of  $k$ . **(CBSE 2018-1M)**
2. If one root of the quadratic equation  $6x^2 - x - k = 0$  is  $\frac{2}{3}$ , then find the value of  $k$ . **(CBSE 2017-1M)**
3. Find the values of  $k$ , if the quadratic equation  $3x^2 - \sqrt{3}kx + 4 = 0$  has equal roots. **(CBSE 2017-1M)**
4. Write the nature of roots of quadratic equation  $4x^2 + 4\sqrt{3}x + 3 = 0$ . **(CBSE 2009-1M)**
5. Find the roots of the equation  $x^2 + x - p(p+1) = 0$ , where  $p$  is a constant. **(CBSE 2010-1M)**
6. Find the value of  $p$ , for which one root of the quadratic equation  $px^2 - 14x + 8 = 0$  is 6 times the other. **(CBSE 2017-2M)**
7. Find the roots of the quadratic equation  $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$ . **(CBSE 2017-2M)**
8. Solve for  $x$ :  $\sqrt{3}x^2 + 10x - 8\sqrt{3} = 0$ . **(CBSE 2017-2M)**
9. Solve for  $x$ :  $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$ . **(CBSE 2017-3M)**
10. Find the roots of the quadratic equation.  $\sqrt{3}x^2 - 2\sqrt{2}x - 2\sqrt{3} = 0$ . **(CBSE 2010-3M)**
11. Find the value of  $p$  so that the quadratic equation  $px(x-3) + 9 = 0$  has two equal roots. **(CBSE 2010-2M)**
12. Find the value of  $k$  for which the roots of the quadratic equation  $2x^2 + kx + 8 = 0$  will have equal value. **(CBSE 2017-2M)**
13. Find the value of  $k$  for which the equation  $x^2 + k(2x+k-1) + 2 = 0$  has real and equal roots. **(CBSE 2017-2M)**
14. Find the value of  $k$  for which the equation  $(k-5)x^2 + 2(k-5)x + 2 = 0$  has real and equal roots. **(CBSE 2010-2M)**
15. A plane left 30 minutes late than its scheduled time and in order to reach the destination 1500 km away in time, it had to increase its speed by 100 km/h from the usual speed. Find its usual speed. **(CBSE 2018-3M)**
16. 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 2017-3M)**
17. 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 2017-3M)**
18. If the equation  $(1+m^2)x + 2mcx + c^2 - a^2 = 0$  has equal roots then show that  $c^2 = a^2(1+m^2)$ . **(CBSE 2017-3M)**
19. Find the roots of the quadratic equation:  $2\sqrt{3}x^2 - 5x + \sqrt{3} = 0$ . **(CBSE 2010-3M)**
20. A motor boat whose speed is 18 km/hr in still water takes 1hr more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream. **(CBSE 2018-4M)**
21. 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/hr more than its original speed. If it takes 3 hours to complete total journey, what is the original average speed? **(CBSE 2018-4M)**

22. A train travelling at a uniform speed for 360 km would have taken 48 minutes less to travel the same distance if its speed were 5 km/hour more. Find the original speed of the train. **(CBSE 2017-4M)**
23. Solve for x :  $\frac{1}{x+1} + \frac{3}{5x+1} = \frac{5}{x+4}$ ,  $x \neq -1, \frac{-1}{5}, -4$  **(CBSE 2017-4M)**
24. Solve for x :  $\frac{1}{x-2} + \frac{2}{x-1} = \frac{6}{x}$ ,  $x \neq 0, 1, 2$  **(CBSE 2017-4M)**
25. Solve for x :  $\frac{1}{x+1} + \frac{2}{x+2} = \frac{5}{x+4}$ ,  $x \neq -1, -2, -4$  **(CBSE 2010-4M)**
26. Find the roots of the equation:  $\frac{1}{x+4} - \frac{1}{x-7} = \frac{1}{30}$ ,  $x \neq -4, 7$  **(CBSE 2010-4M)**
27. Check whether the equation  $5x^2 - 6x - 2 = 0$  has real roots and if it has, find them by the method of completing the square. Also verify that roots obtained satisfy the given equation. **(CBSE 2017-4M)**
28. A and B working together can do a work in 6 days. If A takes 5 days less than B to finish the work, in how many days B alone can do the work ? **(CBSE 2017-4M)**
29. 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 2017-4M)**
30. Two water taps together can fill a tank in 6 hours. The larger diameter tap takes 9 hours less than the smaller diameter tap to fill the tank separately. Find the time in which each tap can separately fill the tank. **(CBSE 2010-4M)**
31. 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 2017-4M)**
32. Three consecutive positive integers are such that the sum of the square of first and product of rest two integers is 46, find the integers. **(CBSE 2010-4M)**
33. The difference of squares of two numbers is 88. If the larger number is 5 less than twice the smaller number, then find two numbers. **(CBSE 2010-4M)**
34. A trader bought a number of articles for Rs 900. Five articles were found damaged. He sold each of the remaining articles at Rs. 2 more than what he paid for it. He got profit transaction. Find the number of articles he bought. **(CBSE 2009-6M)**
35. Two years ago the man's age was three times the square of his son's age. Three years hence his age will be four times his son's age. Find their present ages. **(CBSE 2009-6M)**
36. A motor boat whose speed is 20km/hr in still water, takes 1 hour more to go upstream than downstream to the same spot. Find the speed of the stream. **(CBSE 2010-4M)**

**CLASS X: ARITHMETIC PROGRESSION**  
**(PREVIOUS YEARS BOARD QUESTIONS)**

1. Find the sum of first 25 terms of an A.P. whose  $n$ th term is  $1-4n$ . **CBSE2007-2M**
2. Which term of the A.P. 3, 15, 27, 39 ... will be 132 more than its 54th term? **CBSE2007-3M**
3. The  $n$ th term of an A.P. is  $6n + 2$ . Find its common difference. **CBSE2008-1M**
4. Find the 10th term from the end of the A.P. 8, 10, 12,.....,126.  
**CBSE2008-2M**
5. For what value of  $p$ , are  $2p-1$ , 7 and  $3p$  three consecutive terms of an A.P.? **CBSE2009-1M**
6. If  $S_n$ , the sum of first  $n$  terms of an A.P. is given by  $S_n = 3n^2 - 4n$  then find its  $n$ th term. **CBSE2009-2M**
7. The sum of 4th and 8th terms of an A.P. is 24 and sum of 6th and 10th terms is 44. Find A.P. **CBSE2009-3M**
8. If  $\frac{4}{5}$ ,  $a$ , 2 are three consecutive terms of an A.P., then find the value of  $a$ . **CBSE2009-1M**
9. Which term of the A.P. 3, 15, 27, 39 ... will be 120 more than its 21<sup>st</sup> term? **CBSE2009-2M**
10. The sum of first six terms of an arithmetic progression is 42. The ratio of its 10th term to its 30th term is 1: 3. Calculate the first and the thirteenth term of the A.P. **CBSE2009-3M**
11. If the sum of first  $p$  terms of an A.P., is  $ap^2+bp$ , find its common difference.  
**CBSE2010-1M**
12. In an A.P., the first term is 2, the last term is 29 and sum of terms is 155. Find the common difference of A.P. **CBSE2010-2M**
13. In an A.P., the sum of first ten terms is -150 and the sum of its next ten terms is -550. Find A.P. **CBSE2010-3M**
14. If the first  $m$  terms of an A.P. is  $2m^2+3m$ , then what is its second term? **CBSE2010-1M**
15. In an A.P., the first term is -4, the last term is 29 and the sum of all its terms is 150. Find its common difference. **CBSE2010-2M**
16. The sum of first sixteen terms of an A.P. is 112 and the sum of its next fourteen terms is 518. Find A.P. **CBSE2010-3M**
17. In an AP, if  $d=-2$ ,  $n=5$  and  $a_n=0$ . Find the value of  $a$ . **CBSE2011-1M**
18. Find whether -150 is a term of the AP 17,12,7,2,.....? **CBSE2011-2M**
19. Find the value of the middle term of AP: -6,-2,2,.....,58. **CBSE2011-3M**
20. Determine the AP whose fourth term is 18 and the difference of the ninth term from the fifteenth term is 30. **CBSE2011-3M**
21. Find the value of  $a_{30}-a_{20}$  for the AP 2,7,12,17,..... **CBSE2011-1M**
22. Find sum of first  $n$  terms of AP whose  $n$ th term is  $5n-1$ . Hence find the sum of first 20 terms.  
**CBSE2011-3M**
23. If the  $n$ th term of AP is  $(2n+1)$  then find the sum of its first three terms. **CBSE2012-1M**
24. Find the common difference of AP whose first term is 5 and the sum of first four terms is half the sum of next four terms. **CBSE2012-4M**
25. Find the sum of first 20 odd natural numbers. **CBSE2012-1M**
26. Sum of first 14 terms of an AP is 1505 and its first term is 10. Find 25<sup>th</sup> term. **CBSE2012-4M**
27. Find the common difference of AP:  $\frac{1}{p}, \frac{1-p}{p}, \frac{1-2p}{p}, \dots$  **CBSE2013-1M**
28. Find the number of terms in AP: 18,  $15\frac{1}{2}$ , 13,.....,  $-49\frac{1}{2}$ . Also, find the sum of all its terms.  
**CBSE2013-3M**
29. If the sum of first 7 terms of an AP is 49 and that of first seventeen terms is 289 then find the sum of first  $n$  terms. **CBSE2013-4M**
30. The first three terms of AP are  $3y-1$ ,  $3y+5$  and  $5y+1$ . Find the value of  $y$ . **CBSE2014-1M**
31. The first and last terms of an AP are 7 and 49 respectively. If the sum of all its terms is 420, find the common difference. **CBSE2014-2M**

32. If the 7<sup>th</sup> term of AP is  $\frac{1}{9}$  and 9<sup>th</sup> term is  $\frac{1}{7}$ . Find its 63<sup>rd</sup> term. **CBSE2014-3M**
33. In an AP of 50 terms, sum of first 10 terms is 210 and sum of its last 15 terms is 2565. Find the AP. **CBSE2014-4M**
34. In an AP, if  $S_5 + S_7 = 167$  and  $S_{10} = 235$ , then find the AP, where  $S_n$  denotes the sum of its first n terms. **CBSE2015-2M**
35. The 14th term of an AP is twice its 8th term. If its 6th term is  $-8$ , then find the sum of its first 20 terms. **CBSE2015-3M**
36. Find the 60th term of the AP 8, 10, 12, ..., if it has a total of 60 terms and hence find the sum of its last 10 terms. **CBSE2015-4M**
37. Find the middle term of AP: 6, 13, 20, ..., 216. **CBSE2015-1M**
38. If  $S_n$  denotes sum of first n terms of an AP then prove that  $S_{12} = 3(S_8 - S_4)$ .  
**CBSE2015-3M**
39. For what value(s) of k will k+9, 2k-1 and 2k+7 are the consecutive terms of an AP?  
**CBSE2016-1M**
40. The 4<sup>th</sup> term of AP is 0. Prove that 25<sup>th</sup> term is 3 times 11<sup>th</sup> term. **CBSE2016-2M**
41. The digits of a positive three digit number are in AP and their sum is 15. The number obtained by reversing the digits is 594 less than the original number. Find the number.  
**CBSE2016-3M**
42. Find the 9th term from the end (towards the first term) of the A.P. 5, 9, 13, ....., 185.  
**CBSE2016-1M**
43. How many terms of the A.P. 18, 16, 14, .... be taken so that their sum is zero? **CBSE2016-2M**
44. If the sum of first 7 terms of an A.P. is 49 and that of its first 17 terms is 289, find the sum of first n terms of the A.P. **CBSE2016-3M**
45. What is the common difference of an A.P. in which  $a_{21} - a_7 = 84$ ? **CBSE2017-1M**
46. Which term of the progression  $20, 19\frac{1}{4}, 18\frac{1}{2}, 17\frac{3}{4}, \dots$  is the first negative term? **CBSE2017-2M**
47. The first term of an A.P. is 5, the last term is 45 and the sum of all its terms is 400. Find the number of terms and the common difference of the A.P. **CBSE2017-3M**
48. If the ratio of the sum of the first n terms of two A.Ps is  $(7n + 1) : (4n + 27)$ , then find the ratio of their 9th terms. **CBSE2017-4M**
49. In an AP, if the common difference  $(d) = -4$ , and the seventh term  $(a_7)$  is 4, then find the first term. **CBSE2018-1M**
50. Find the sum of first 8 multiples of 3. **CBSE2018-2M**
51. 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.  
**CBSE2018-4M**
52. Write the m<sup>th</sup> term of  $\frac{1}{k}, \frac{1+k}{k}, \frac{1+2k}{k}, \dots$  **CBSE2018-1M**
53. The 5th and 15th terms of an A.P. are 13 and  $-17$  respectively. Find the sum of first 21 terms of the A.P. **CBSE2018-2M**
54. The sum of the first n terms of an A.P. is  $5n^2 + 3n$ . If its m<sup>th</sup> term is 168, find the value of m. Also find the 20th term of the A.P. **CBSE2018-4M**
55. The 4th and the last terms of an A.P. are 11 and 89 respectively. If there are 30 terms in the A.P., find the A.P. and its 23rd term. **CBSE2018-4M**
56. In an A.P if sum of its first n terms is  $3n^2 + 5n$  and its kth term is 164, find the value of k.  
**CBSE2018-3M**
57. If the 17th term of an A.P. exceeds its 10th term by 7, find the common difference of the A.P. **CBSE2018-1M**
58. The first and the last terms of an A.P. are 17 and 350 respectively. If its common difference is 9, find the number of terms in the A.P. and find their sum. **CBSE2018-2M**
59. Find the common difference of an A.P. whose first term is 5 and the sum of its first four

terms is half the sum of its next four terms. **CBSE2018-4M**

60. Find three numbers in A.P. whose sum is 15 and whose product is 105. **CBSE2018-4M**

**CLASS X: TRIANGLES**

**(PREVIOUS YEARS BOARD QUESTION PAPERS)**

1. In  $\Delta ABC$ ,  $DE \parallel BC$ . If  $DE = \frac{2}{3} BC$  and area of  $\Delta ABC = 81 \text{ cm}^2$ , find the area of  $\Delta ADE$ . **(CBSE 2009-1M)**

2. In  $\Delta LMN$ ,  $\angle L = 60^\circ$ ,  $\angle M = 50^\circ$ . If  $\Delta LMN \sim \Delta PQR$ , find  $\angle R$ . **(CBSE 2010-1M)**

3. In fig 1,  $PT = 2 \text{ cm}$ ,  $TR = 4 \text{ cm}$ ,  $ST \parallel QR$ . Find the ratios of area of  $\Delta PST$  &  $\Delta PQR$ . **(CBSE 2010-1M)**

4. In fig.2,  $\Delta AHK \sim \Delta ABC$ . If  $AK = 10 \text{ cm}$ ,  $BC = 3.5 \text{ cm}$ ,  $HK = 7 \text{ cm}$ . Find  $AC$ . **(CBSE 2010-1M)**

5. In fig 5,  $MN \parallel AB$ ,  $BC = 7.5 \text{ cm}$ ,  $AM = 4 \text{ cm}$ ,  $MC = 2 \text{ cm}$ . Find  $BN$ . **(CBSE 2010-1M)**

6. In  $\Delta PRQ$ ,  $ST \parallel RQ$ ,  $PS = 3 \text{ cm}$  and  $SR = 4 \text{ cm}$ . Find the ratio of the area of  $\Delta PST$  to the area of  $\Delta PRQ$ . **(CBSE 2017-1M)**

7. Given  $\Delta ABC \sim \Delta PQR$ , if  $\frac{AB}{PQ} = \frac{1}{3}$ , then find  $\frac{\text{ar } \Delta ABC}{\text{ar } \Delta PQR}$ . **(CBSE 2018-1M)**

8. In fig-2,  $AB \parallel DE$ ,  $BD \parallel EF$ . Prove that  $DC^2 = CF \times AC$ .  $\angle R$ . **(CBSE 2007, 2010-2M)**

9. In  $\Delta ABC$ ,  $AB = AC$ ,  $D$  is a point on side  $AC$  such that  $BC^2 = AC \times CD$ . Prove that  $BD = BC$ . **(CBSE 2010-2M)**

10.  $P$  and  $Q$  are points on sides  $CA$  and  $CB$  respectively of  $\Delta ABC$ , right angled at  $C$ . Prove that  $AQ^2 + BP^2 = AB^2 + PQ^2$ . **(CBSE 2007-2M)**

11. In Fig. 9,  $PQ = 24 \text{ cm}$ ,  $QR = 26 \text{ cm}$ ,  $\angle PAR = 90^\circ$ ,  $PA = 6 \text{ cm}$  and  $AR = 8 \text{ cm}$ . Find  $\angle QPR$ . **(CBSE 2008-2M)**

12.  $P$  and  $Q$  are points on the sides  $AB$  and  $AC$  respectively of  $\Delta ABC$  such that  $AP = 3.5 \text{ cm}$ ,  $PB = 7 \text{ cm}$ ,  $AQ = 3 \text{ cm}$  and  $QC = 6 \text{ cm}$ . If  $PQ = 4.5 \text{ cm}$ , find  $BC$ . **(CBSE 2008-2M)**

13. The perpendicular  $AD$  on the base  $BC$  of  $\Delta ABC$  intersects  $BC$  in  $D$  such that  $BD = 3CD$ . Prove that  $2AB^2 = 2AC^2 + BC^2$ . **(CBSE 2010-3M)**

14. In fig4,  $\Delta ABC$  is a right angles triangle, right angled at  $C$ .  $DE \perp AB$ . Prove that  $\Delta ABC \sim \Delta ADE$ , hence find the lengths of  $AE$  and  $DE$ . **(CBSE 2010-3M)**

15. In fig.3,  $\Delta ABC$  is right angled at  $C$ .  $D$  is the midpoint of  $BC$ . Prove that  $AB^2 = 4AD^2 - 3AC^2$ . **(CBSE 2010-3M)**

16. In  $\Delta ABC$ , right angles at  $A$ ,  $BL$  and  $CM$  are two medians. Prove that  $4(BL^2 + CM^2) = 5BC^2$ . **(CBSE 2010-3M)**

17. In given figure 7,  $\angle 1 = \angle 2$  &  $\Delta NSQ \cong \Delta MTR$  then prove that  $\Delta PTS \sim \Delta PRQ$ . **(CBSE 2017-3M)**

18. Prove that the area of an equilateral triangle described on one side of the square is equal to half the area of the equilateral

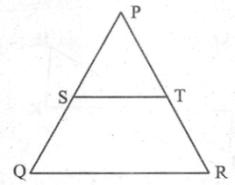


Fig. 1

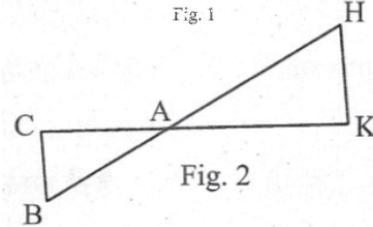


Fig. 2

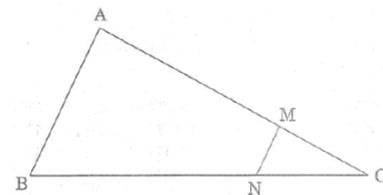


Figure 5

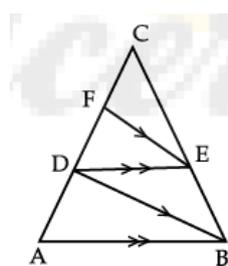


Figure - 2

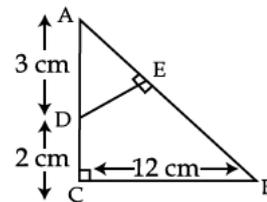


Figure - 4

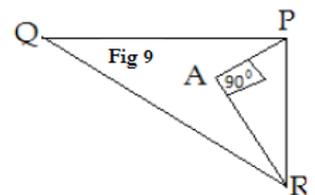


Fig 9

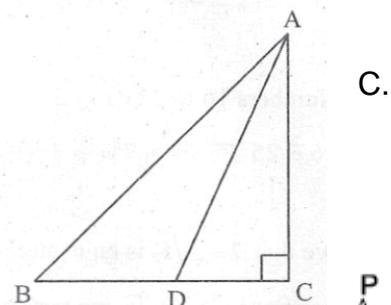


Fig. 3

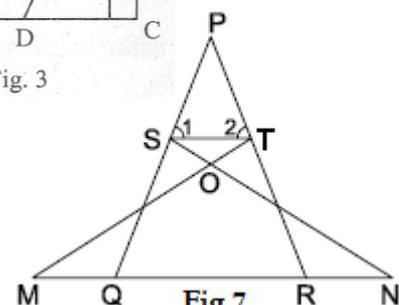


Fig 7

triangle described on one of its diagonal. **(CBSE 2018-3M)**

19. If the diagonals of a quadrilateral divide each other proportionally prove that it is a trapezium. **(CBSE 2008-3M)**
20. Two triangles ABC and DBC are on the same base BC and on the same side of BC in which  $\angle A = \angle D = 90^\circ$ . If CA and BD meet each other at E, show that  $AE \cdot EC = BE \cdot ED$ . **(CBSE 2008-3M)**

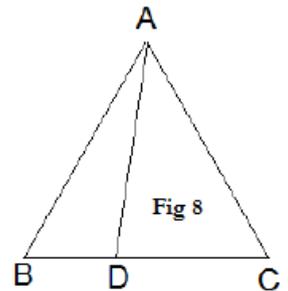
21. In an equilateral triangle ABC (Fig 8), D is a point on the side BC such that  $BD = \frac{1}{3} BC$ . Prove that  $9AD^2 = 7AB^2$ . **(CBSE 2017-3M & 2018-4M)**

22. If the area of two similar triangles are equal, prove that they are congruent. **(CBSE 2018-3M)**

23. Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides. Using the above theorem prove the following: The area of the equilateral triangle described on the side of a square is half the area of the equilateral triangle described on its diagonal. **(CBSE 2008, 2009, 2010-4M)**

24. Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides. Also, in  $\triangle ABC$ , XY is parallel to BC and it divides triangle ABC into two parts of equal area.

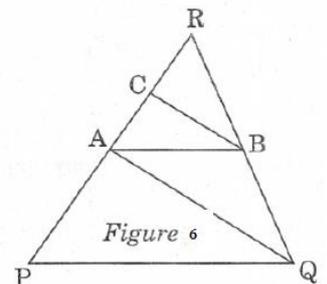
Prove that  $\frac{BX}{AB} = \frac{\sqrt{2}-1}{\sqrt{2}}$ . **(CBSE 2008-6M)**



25. Prove that in a triangle, if square of one side is equal to the sum of the squares of the other two sides, then angle opposite to first side is right angle. **(CBSE 2010-4M)**

26. Prove that if the areas of two similar triangles are equal then the triangles are congruent. **(CBSE 2010-4M)**

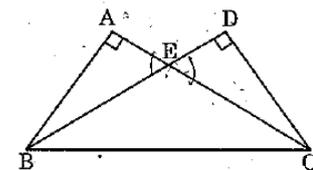
27. If a line is drawn parallel to one side of a triangle to intersect other two sides in distinct points, prove that the other two sides are divided in the same ratio. Using the above, do the following. In fig 6,  $PQ \parallel AB$ ,  $AQ \parallel CB$ . Prove that  $AR^2 = PR \times CR$ . **(CBSE 2007, 2010-4M)**



28. If a line is drawn parallel to one side of a triangle to intersect other two sides in distinct points, prove that the other two sides are divided in the same ratio. Also, In triangle ABC,  $DE \parallel BC$  and  $BD = CE$ . Prove that ABC is an isosceles triangle. **(CBSE 2007, 6M)**

29. 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 2018-4M)**

30. Two triangles ABC and DBC are on the same base BC in which  $\angle A = \angle D = 90^\circ$ . If CA and BD meet each other at E, show that  $AE \times CE = BE \times ED$ . **(CBSE SQP-2M)**



31. The diagonals of a trapezium ABCD with  $AB \parallel DC$  intersect each other at point O. If  $AB = 2CD$ , find the ratio of the areas of triangles AOB and COD. **(CBSE SQP-3M)**

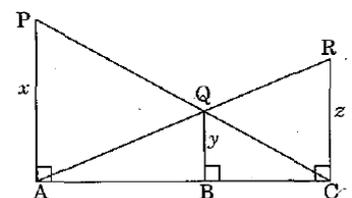
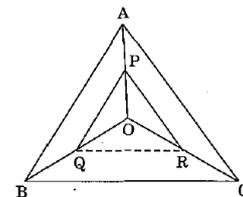
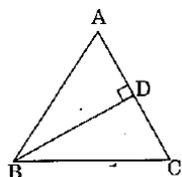
32. In figure, S and T trisect the side QR of a right triangle PQR. Prove that  $8PT^2 = 3PR^2 + 5PS^2$ . **(CBSE SQP-3M)**

33. In figure,  $PQ \parallel AB$  and  $PR \parallel AC$ . Prove that  $QR \parallel BC$ . **(CBSE SQP-2M)**

34. In figure, PA, QB and RC are each perpendicular to AC.

Prove that  $\frac{1}{x} + \frac{1}{y} = \frac{1}{z}$ . **(CBSE SQP-4M)**

35. In an isosceles triangle ABC with  $AB = AC$ , BD is perpendicular from B to the side AC. Prove that  $BD^2 - CD^2 = 2CD \times AD$ . **(CBSE SQP-4M)**

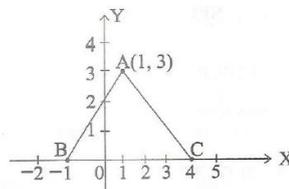


**CLASS X: CO-ORDINATE GEOMETRY**  
**(PREVIOUS YEARS BOARD QUESTIONS)**

1. Show that the points (7, 10), (-2, 5) and (3, -4) are the vertices of an isosceles right triangle. **CBSE2007-3M**
2. In what ratio does the line  $x-y-2 = 0$  divide the line segment joining (3, -1) and (8, 9)? **CBSE2007-3M**
3. For what value of p, are points (2, 1), (p, -1) and (-1, 3) collinear? **CBSE2008-2M**
4. If the distances of P(x, y) from the points A(3, 6) and B(-3, 4) are equal, prove that  $3x + y = 5$ . **CBSE2008-3M**
5. Determine the ratio in which the line  $3x + 4y - 9 = 0$  divides the line-segment joining the points (1, 3) and (2, 7). **CBSE2008-3M**
6. Find the value of **a** so that the point (3, a) lies on the line represented by  $2x - 3y = 5$ . **CBSE2009-1M**
7. Find the point on y-axis which is equidistant from the points (5, -2) and (-3, 2). **CBSE2009-3M**
8. 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**. **CBSE2009-3M**
9. If P(x, y) is any point on the line joining the points A (a, 0) and B (0, b), then show that  $\frac{x}{a} + \frac{y}{b} = 1$ . **CBSE2009-3M**
10. If the points A (4, 3) and B (x, 5) are on the circle with the centre O(2, 3), find the value of **x**. **CBSE2009-2M**
11. Find the ratio in which the point (2, y) divides the line segment joining the points A (-2, 2) and B (3, 7). Also find the value of **y**. **CBSE2009-3M**
12. Find the area of the quadrilateral ABCD whose vertices are A (-4, -2), B (-3, -5), C (3, -2) and D (2, 3). **CBSE2009-3M**
13. If P(2,p) is the mid-point of the line segment joining the points A(6,-5) and B(-2,11), find the value of **p**. **CBSE2010-1M**
14. If A(1,2), B(4,3) and C(6,6) are the vertices of parallelogram ABCD, find the coordinates of vertex **D**. **CBSE2010-1M**
15. Point P divides the line segment joining the points A(2,1) and B(5,-8) such that  $\frac{AP}{AB} = \frac{1}{3}$ . If p lies on the line  $2x-y+k=0$ , find the value of **k**. **CBSE2010-3M**
16. If R(x,y) is a point on the line segment joining the points P(a,b) and Q(b,a), then prove that  $x+y=a+b$ . **CBSE2010-3M**
17. Find the distance between the points, A(2a,6a) and B(2a +  $\sqrt{3}a$ ,5a). **CBSE2010-1M**
18. Find the value of **k** if P(4,-2) is the midpoint of line segment joining the points A(5k,3) and B(-k,-7). **CBSE2010-1M**
19. If point P( $\frac{1}{2}$ , y) lies on line segment joining the points A(3,-5) and B(-7,9), then find the ratio in which P divides AB. Also find the value of **y**. **CBSE2010-3M**
20. Find the value of **k** for which the points A(9,k), B(4,-2) and C(3,-3) are collinear. **CBSE2010-3M**
21. Find the quadrant in which the point P that divides the line segment joining the points A(2,-5) and B(5,2) in the ratio 2:3. **CBSE2011-1M**
22. The mid-points of line segment AB is the point P(0,4). If the coordinates of B are (2,-3) then find the coordinates of **A**. **CBSE2011-1M**
23. Find the values of **x** for which the distance between the points P(x,4) and Q(9,10) is 10 units. **CBSE2011-2M**
24. If (3,3), (6,y), (x,7) and (5,6) are the vertices of parallelogram taken in order then find

the values of x and y. **CBSE2011-3M**

25. If two vertices of equilateral triangle are (3,0) and (6,0), find the third vertex. **CBSE2011-3M**
26. Find the value of k, if the points P(5,4), Q(7,k) and R(9,-2) are collinear. **CBSE2011-3M**
27. Find the area of the triangle formed by points A(a,0), O(0,0) and B(0,b). **CBSE2011-1M**
28. Find a relation between x and y such that the point P(x,y) is equidistant from the points A(1,4) and B(-1,2). **CBSE2011-2M**
29. Find the area of quadrilateral formed by the vertices A(3,-1), B(9,-5), C(14,0) and D(9,19). **CBSE2011-3M**
30. Find the coordinates of the point which divides the line segment joining the points A(2,-3) and B(-4,-6) into three equal parts. **CBSE2011-3M**
31. Show that the vertices A(3,5), B(6,0), C(1,-3) and D(-2,2) are the vertices of square ABCD. **CBSE2011-3M**
32. Find the distance of the point (-3,4) from the x-axis. **CBSE2012-1M**
33. P(5,-3), Q(3,y) are the points of trisection of the line segment joining the points A(7,-2) and B(1,-5). Find the values of y. **CBSE2012-1M**
34. Find the value of k, if P(2,4) is equidistant from the points A(5,k) and B(k,7). **CBSE2012-2M**
35. Find the co-ordinates of point P, which lies on line segment joining A(-2,-2) and B(2,-4) such that  $AP = \frac{3}{7}AB$ . **CBSE2012-3M**
36. Find the area of quadrilateral formed by the vertices A(-3,-1), B(-2,-4), C(4,-1) and D(3,4). **CBSE2012-3M**
37. If the points A(x,y), B(3,6) and C(-3,4) are collinear, show that  $x-3y+15=0$ . **CBSE2012-3M**
38. If the coordinates of one end of a diameter of circle are (2,3) and that of centre are (-2,5) then find the coordinates of other end of diameter. **CBSE2012-1M**
39. Find the coordinates of the point P dividing the line segment joining the points A(1,3) and B(4,6) in the ratio 2:1. **CBSE2012-1M**
40. If a point A(0,2) is equidistant from B(3,p) and C(p,5), then find the values of p. **CBSE2012-2M**
41. A point P divides the line segment joining the points A(3,-5) and B(-4,8) such that  $\frac{AP}{PB} = \frac{k}{1}$ . If p lies on the line  $x+y=0$ , then find the value of k. **CBSE2012-3M**
42. If the vertices of triangle are (1,-3), (4,p) and (-9,7) and its area is 15 sq.units. Find the value(s) of p. **CBSE2012-3M**
- 43.



Find the area of the triangle given in the figure.

**CBSE2013-1M**

44. Prove that the points (7,10), (-2,5) and (3,-4) are the vertices of isosceles right triangle. **CBSE2013-3M**
45. Find the ratio in which the y-axis divides the line segment joining the vertices (-4,-6) and (10,12). Also find the coordinates of point of division. **CBSE2013-3M**
46. The three vertices of parallelogram ABCD are A(3,-4), B(-1,-3) and C(-6,2). Find the coordinates of vertex D and also find its area. **CBSE2013-4M**
47. Find the value of x if the points A(x,2), B(-3,-4) and C(7,-5) are collinear. **CBSE2014-1M**
48. 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 circle. **CBSE2014-3M**
49. 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. **CBSE2014-3M**

50. Find the ratio in which P(x,2) divides the line segment joining points A(12,5) and B(4,-3). Also find value of x. **CBSE2014-4M**
51. The points A(4, 7), B(p, 3) and C(7, 3) are the vertices of a right triangle, right-angled at B. Find the value of p. **CBSE2015-2M**
52. Find the relation between x and y if the points A(x, y), B(-5, 7) and C(-4, 5) are collinear. **CBSE2015-2M**
53. If the coordinates of points A and B are (-2, -2) and (2, -4) respectively, find the coordinates of P such that  $AP = \frac{3}{7} AB$ , where P lies on the line segment AB. **CBSE2015-3M**
54. Find the values of k so that the area of the triangle with vertices (1, -1), (-4, 2k) and (-k, -5) is 24 sq. units. **CBSE2015-4M**
55. If A(5,2), B(2,-2) and C(-2,t) are the vertices of right angles triangle with  $\angle B = 90^\circ$ , then find the value of t. **CBSE2015-2M**
56. Find the ratio in which the point  $P\left(\frac{3}{4}, \frac{5}{12}\right)$  divides the line segment joining the points  $A\left(\frac{1}{2}, \frac{3}{2}\right)$  and B(2,-5). **CBSE2015-2M**
57. Find the area of triangle ABC with A(1,-4) and mid-points of sides through A being (2,-1) and (0,-1). **CBSE2015-3M**
58. Find the area of quadrilateral formed by the vertices A(-4,8), B(-3,-4), C(0,-5) and D(5,6). **CBSE2015-4M**
59. Prove that points (3,0), (6,4) and (-1,3) are the vertices of a right angles isosceles triangle. **CBSE2016-2M**
60. 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 near to A. Find the coordinates of P and Q. **CBSE2016-2M**
61. If the point P(x,y) is equidistant from the points A(a+b,b-a) and B(a-b, a+b) then prove that  $bx = ay$ . **CBSE2016-3M**
62. 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. **CBSE2016-2M**
63. 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. **CBSE2016-2M**
64. ABC is a triangle coordinates of whose vertex A are (0, -1). D(1,0) and E(0,1) respectively are the mid-points of the sides AB and AC. If F is the mid-point of BC, find the areas of  $\Delta ABC$  and  $\Delta DEF$ . **CBSE2016-3M**
65. Prove that the area of a triangle with vertices (t, t-2), (t+2, t+2) and (t+3, t) is independent of t. **CBSE2016-4M**
66. A line intersects the y-axis and x-axis at the points P and Q respectively. If (2, -5) is the mid-point of PQ, then find the coordinates of P and Q. **CBSE2017-2M**
67. If the distances of P(x, y) from A(5, 1) and B(-1, 5) are equal, then prove that  $3x = 2y$ . **CBSE2017-2M**
68. In what ratio does the point  $\left(\frac{24}{11}, y\right)$  divide the line segment joining the points P(2, -2) and Q(3, 7) ? Also find the value of y. **CBSE2017-3M**
69. If the points A(k + 1, 2k), B(3k, 2k + 3) and C(5k-1, 5k) are collinear, then find the value of k. **CBSE2017-4M**
70. Find the distance of a point P(x, y) from the origin. **CBSE2018-1M**
71. Find the ratio in which P(4, m) divides the line segment joining the points A(2, 3) and B(6, -3). Hence find m. **CBSE2018-2M**
72. If A(-2, 1), B(a, 0), C(4, b) and D(1, 2) are the vertices of a parallelogram ABCD, find

the values of a and b. Hence find the lengths of its sides. **CBSE2018-3M**

73. If A(-5, 7), B(-4, -5), C(-1, -6) and D(4, 5) are the vertices of a quadrilateral, find the area of the quadrilateral ABCD. **CBSE2018-3M**
74. Find the value of y for which the distance between the points (2, -3) and (10, y) is 10 units. **CBSE2018-1M**
75. If the point (0, 2) is equidistant from the points (3, k) and (k, 5), find the value of k. **CBSE2018-2M**
76. The line segment joining the points A(2, 1) and B(5, -8) is trisected at the points P and Q, where P is nearer to A. If P lies on the line  $2x - y + k = 0$ , find the value of k. **CBSE2018-3M**
77. The x-coordinate of a point P is twice its y-coordinate. If P is equidistant from the points Q(2, -5) and R(-3, 6), find the coordinates of P. **CBSE2018-3M**
78. A(5, 1); B(1, 5) and C(-3, -1) are the vertices of triangle ABC. Find the length of median AD. **CBSE2018-1M**
79. 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). **CBSE2018-2M**
80. 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. **CBSE2018-3M**
81. If the area of triangle with vertices (x, 3), (4, 4) and (3, 5) is 4 square units, find x. **CBSE2018-3M**
82. If the distance between the points P(x, 2) and Q(3, -6) is 10 units, find the value of x. **CBSE2018-1M**
83. Find a relation between x and y such that the point P(x, y) is equidistant from the points A(1, 4), B(-1, 2). **CBSE2018-2M**
84. The line segment joining the points A(3, -4) and B(1, 2) is trisected at the points P and Q such that P is nearer to A. If the co-ordinates of P and Q are (p, -2) and  $(\frac{5}{3}, q)$  respectively, find the values of p and q. **CBSE2018-3M**
85. Find the ratio in which y-axis divides the line-segment joining the points A(5, -6) and B(-1, 4). Also, find the co-ordinates of the point of division. **CBSE2018-3M**

**CLASS X: TRIGONOMETRY AND ITS APPLICATIONS**  
**(PREVIOUS YEARS BOARD QUESTIONS)**

1. If  $\sin \theta = \frac{1}{3}$ , then find the value of  $(2 \cot^2 \theta + 2)$ . **CBSE2009-1M**
2. If  $\sec^2 \theta(1 + \sin \theta)(1 - \sin \theta) = k$ , find the value of  $k$ . **CBSE2009-1M**
3. If  $3x = \operatorname{cosec} \theta$  and  $\frac{3}{x} = \cot \theta$ , find the value of  $3(x^2 - \frac{1}{x^2})$ . **CBSE2010-1M**
4. If  $6x = \sec \theta$  and  $\frac{6}{x} = \tan \theta$ , find the value of  $9(x^2 - \frac{1}{x^2})$ . **CBSE2010-1M**
5. The angle of elevation of a top of a tower from a point on the ground which is 30 m away from the foot of the tower is  $45^\circ$ . Find the height of the tower. **CBSE2011-1M**
6. At some time of the day, the length of the shadow of the tower is equal to its height. Find the sun's altitude at that time. **CBSE2011-1M**
7. A kite is flying at a height of 30 m from the ground. The length of the string from the kite to the ground is 60 m. Assuming that there is no slack in the string; find the angle of elevation of the kite at the ground. **CBSE2012-1M**
8. The length of the shadow of a tower on the plane ground is  $\sqrt{3}$  time the height of the tower. Find the angle of elevation of the sun. **CBSE2012-1M**
9. The angle of depression of a car, standing on the ground, from the top of a 75 m high tower is  $30^\circ$ . Find the distance of the car from the base of the tower. **CBSE2013-1M**
10. A ladder makes an angle of  $60^\circ$  with the ground when placed against a wall. If the foot of the ladder is 2 m away from the wall, find the length of the ladder. **CBSE2014-1M**
11. The angle of depression of a car parked on the road from the top of a 150 m high tower is  $30^\circ$ . Find the distance of the car from the tower. **CBSE2014-1M**
12. The tops of two towers of height  $x$  and  $y$ , standing on level ground, subtend angles of  $30^\circ$  and  $60^\circ$  respectively at the centre of line joining their feet, then find  $\frac{x}{y}$ .  
**CBSE2015-1M**
13. A tower AB is 20 m high and BC, its shadow on the ground, is  $20\sqrt{3}$  m long. Find the Sun's altitude. **CBSE2015-1M**
14. AB is a 6 m high pole and CD is a ladder inclined at an angle of  $60^\circ$  to the horizontal and reaches up to a point D of pole. If  $AD = 2.54$  m, find the length of the ladder. (use  $\sqrt{3} = 1.73$ ) **CBSE2016-1M**
15. 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  $30^\circ$ . Find the height of tower. **CBSE2016-1M**

16. 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? **CBSE2017-1M**
17. 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 ? **CBSE2017-1M**
18. What is the value of  $(\cos^2 67^\circ - \sin^2 23^\circ)$ ? **CBSE2018-1M**
19. If  $\sin \theta + \cos \theta = \sqrt{2} \cos(90^\circ - \theta)$  find value of  $\cot \theta$  . **CBSE2018-1M**
20. If  $\sqrt{3} \tan \theta = 3 \sin \theta$ , find the value of  $\sin \theta$  . **CBSE2018-1M**
21. Evaluate without using trigonometric tables. **CBSE2018-2M**  

$$\frac{\sin 18^\circ}{\cos 72^\circ} + \sqrt{3}(\tan 10^\circ \times \tan 30^\circ \times \tan 40^\circ \times \tan 50^\circ \times \tan 80^\circ)$$
22. If  $\cot \theta = \frac{15}{8}$ , then find the value of  $\frac{(2+2\sin \theta)(1-\sin \theta)}{(1+\cos \theta)(2-2\cos \theta)}$  **CBSE2009-2M**
23. Find the value of  $\tan 30^\circ$  geometrically. **CBSE2009-2M**
24. Simplify:  $\frac{\sin^3 \theta + \cos^3 \theta}{\sin \theta + \cos \theta} + \sin \theta \cos \theta$  **CBSE2009-2M**
25. Find the value of  $\operatorname{cosec} 30^\circ$  geometrically. **CBSE2010-2M**
26. Find the value of  $\sec 45^\circ$  geometrically. **CBSE2010-2M**
27. Evaluate without using trigonometric tables. **CBSE2010-2M**  

$$\frac{\sin(90^\circ - \theta) \times \operatorname{cosec} \theta - \tan(90^\circ - \theta) \times \cot \theta + \cos^2 25^\circ + \cos^2 65^\circ}{3 \tan 27^\circ \times \tan 63^\circ}$$
28. Evaluate without using trigonometric tables. **CBSE2010-2M**  

$$\tan(90^\circ - \theta) \times \cot \theta - \sec(90^\circ - \theta) \times \operatorname{cosec} \theta + \sqrt{3} \tan 12^\circ \times \tan 60^\circ \times \tan 78^\circ$$
29. A, B, C are interior angles of triangle ABC. Prove that  $\operatorname{cosec}(\frac{A+B}{2}) = \sec \frac{C}{2}$ . **CBSE2018-2M**
30. Prove that  $\frac{\cos A}{1-\tan A} + \frac{\sin A}{1-\cot A} = \sin A + \cos A$ . **CBSE2007-3M**
31. Evaluate without using trigonometric tables. **CBSE2007-3M**  

$$\frac{3 \cos 55^\circ}{7 \sin 35^\circ} - \frac{4(\cos 70^\circ \times \operatorname{cosec} 20^\circ)}{7(\tan 25^\circ \times \tan 5^\circ \times \tan 45^\circ \times \tan 65^\circ \times \tan 85^\circ)}$$

32. Prove that  $\frac{\cot A - \cos A}{\cot A + \cos A} = \frac{\operatorname{cosec} A - 1}{\operatorname{cosec} A + 1}$ . **CBSE2008-3M**
33. Prove that  $(1 + \cot A - \operatorname{cosec} A)(1 + \tan A + \sec A) = 2$ . **CBSE2008-3M**
34. Find the value of  $\sin 30^\circ$  geometrically. **CBSE2009-3M**
35. Evaluate: **CBSE2009-3M**  
 $\frac{2}{3} \operatorname{cosec}^2 58^\circ - \frac{2}{3} \cot 58^\circ \tan 52^\circ - \frac{5}{3} \tan 13^\circ \times \tan 37^\circ \times \tan 45^\circ \times \tan 53^\circ \times \tan 77^\circ$
36. Evaluate without using trigonometric tables. **CBSE2009-3M**  
 $\frac{\cos 58^\circ}{\sin 32^\circ} + \frac{\sin 22^\circ}{\cos 68^\circ} - \frac{\cos 38^\circ \times \operatorname{cosec} 52^\circ}{\tan 18^\circ \times \tan 35^\circ \times \tan 60^\circ \times \tan 72^\circ \times \tan 55^\circ}$
37. Prove that  $\frac{\tan A}{1 - \cot A} + \frac{\cot A}{1 - \tan A} = 1 + \tan A + \cot A$ . **CBSE2010-3M**
38. Prove that  $(\operatorname{cosec} A - \sin A)(\sec A - \cos A) = \frac{1}{\tan A + \cot A}$ . **CBSE2010-3M**
39. If  $\tan \theta + \sin \theta = m$  &  $\tan \theta - \sin \theta = n$  then show that  $m^2 - n^2 = 4\sqrt{mn}$ . **CBSE2010-3M**
40. Show that:  $(1 + \frac{1}{\tan^2 \theta}) + (1 + \frac{1}{\cot^2 \theta}) = \frac{1}{\sin^2 \theta - \sin^4 \theta}$ . **CBSE2010-3M**
41. From the top of a tower 100 m high, a man observes two cars on the opposite sides of the tower with angle of depression as  $30^\circ$  and  $45^\circ$  respectively. Find the distance between the cars. (use  $\sqrt{3} = 1.73$ ) **CBSE2011- 3M**
42. A ladder of length 6 m makes an angle of  $45^\circ$  with the floor while leaning against a wall of a room. If the foot of the ladder is kept fixed on the floor and it is made to lean against the opposite wall of the room, it make an angle of  $60^\circ$  with the floor. Find the distance between the two walls of the room. **CBSE2011- 3M**
43. The angles of depression of the top and bottom of a tower as seen from the top of cliff of a high  $60\sqrt{3}m$  are  $45^\circ$  and  $60^\circ$  respectively. Find the height of the tower. **CBSE2012- 3M**
44. The angles of depression of two ships from the top of a light house and on the same side of it are found to be  $45^\circ$  and  $30^\circ$ . If the ships are 200 m apart, find the height of the light house. **CBSE2012- 3M**
45. The horizontal distance between two poles is 15 m. The angle of depression of the top of first pole as seen from the top of second pole is  $30^\circ$ . If the height of second pole is 24 m, find the height of the first pole. (use  $\sqrt{3} = 1.73$ ) **CBSE2013- 3M**
46. Two ships are there in the sea on both side of the light house in such a way that two ships and the light house are in a straight line. The angles of depression of two ships as observed from the top of the light house are  $60^\circ$  and  $45^\circ$ . If the height of light house

is 200 m, find the distance between two ships. (use  $\sqrt{3} = 1.73$ ) **CBSE2014- 3M**

47. The angle of elevation of an aeroplane from a point on the ground is  $60^\circ$ . After a flight of 30 seconds the angle of elevation becomes  $30^\circ$ . If the aeroplane is flying at a constant height of  $3000\sqrt{3} m$ , find the speed of the aeroplane. **CBSE2014- 3M**
48. The angle of elevation of the top of a building from the foot of the tower is  $30^\circ$  and the angle of elevation of the top of the tower from the foot of the building is  $45^\circ$ . If the tower is 30 m high, find the height of the building. **CBSE2015-3M**
49. The angle of elevation of an aeroplane from a point A on the ground is  $60^\circ$ . After a flight of 15 seconds, the angle of elevation changes to  $30^\circ$ . If the aeroplane is flying at a constant height of  $1500\sqrt{3} m$ , find the speed of the plane in km/hr. **CBSE2015-3M**
50. The angles of depression of the top and bottom of a 50 m high building from the top of a tower are  $45^\circ$  and  $60^\circ$  respectively. Find the height of the tower and the horizontal distance between the tower and the building. (use  $\sqrt{3} = 1.73$ ) **CBSE2016- 3M**
51. Two men on either side of a 75 m high building and in line with base of building observe the angles of elevation of the top of the building as  $30^\circ$  and  $60^\circ$ . Find the distance between the two men. (use  $\sqrt{3} = 1.73$ ) **CBSE2016- 3M**
52. 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. **CBSE2017- 3M**
53. 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  $60^\circ$  to  $45^\circ$  in 2 minutes. Find the speed of the boat in m/h. **CBSE2017- 3M**
54. If  $4 \tan \theta = 3$ , evaluate  $\left(\frac{4 \sin \theta - \cos \theta + 1}{4 \sin \theta + \cos \theta - 1}\right)$ . **CBSE2018- 3M**
55. If  $\tan 2A = \cot (A - 18^\circ)$ , where  $2A$  is an acute angle, find the value of  $A$ . **CBSE2018- 3M**
56. Prove that  $\frac{1}{\operatorname{cosec} \theta + \cot \theta} - \frac{1}{\sin \theta} = \frac{1}{\sin \theta} - \frac{1}{\operatorname{cosec} \theta - \cot \theta}$ . **CBSE2018- 3M**
57. If  $\tan \theta + \sin \theta = m$ ,  $\tan \theta - \sin \theta = n$ , show that  $m^2 - n^2 = 4 \sqrt{mn}$ . **CBSE2018- 3M**
58. Prove that  $\left(\frac{1 + \tan^2 A}{1 + \cot^2 A}\right) = \left(\frac{1 - \tan A}{1 - \cot A}\right)^2 = \tan^2 A$  **CBSE2018- 3M**
59. Evaluate  $\frac{\cos 58^\circ}{\sin 32^\circ} + \frac{\sin 22^\circ}{\cos 68^\circ} - \frac{\cos 38^\circ \operatorname{cosec} 52^\circ}{\sqrt{3}(\tan 18^\circ \tan 35^\circ \tan 60^\circ \tan 72^\circ \tan 55^\circ)}$  **CBSE2018- 3M**

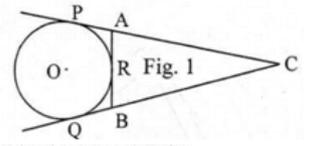
60. Prove that  $\frac{\sin \theta}{1 + \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} = 2 \operatorname{cosec} \theta$  **CBSE2018- 3M**
61. If  $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$ , show that  $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$ . **CBSE2018- 3M**
62. A boy standing on a horizontal plane finds a bird flying at a distance of 100 m from him at an elevation of  $30^\circ$ . A girl standing on the roof of 20 metre high building finds the angle of elevation of the same bird to be  $45^\circ$ . Both the boy and the girl are on opposite sides of the bird. Find the distance of bird from the girl. **CBSE2007- 4M**
63. A statue 1.46 m tall, stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is  $60^\circ$  and from the same point, the angle of elevation of the top of the pedestal is  $45^\circ$ . Find the height of the pedestal.  
(use  $\sqrt{3} = 1.73$ ) **CBSE2008- 4M**
64. An aeroplane when flying at a height of 3125 m from the ground passes vertically below another plane at an instant when the angles of elevation of the two planes from the same point on the ground are  $30^\circ$  and  $60^\circ$  respectively. Find the distance between the two planes at that instant. **CBSE2009- 4M**
65. 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  $30^\circ$ , 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  $60^\circ$ . Find the time taken by the car to reach the foot of the tower from this point. **CBSE2009- 4M**
66. From the top of a 7 m high building, the angle of elevation of top of tower is  $60^\circ$  and angle of depression of foot of the tower is  $30^\circ$ . Find the height of the tower. **CBSE2010- 4M**
67. From a window (9m above the ground) of a house in a street, the angles of elevation and depression of the top and foot of another house on the opposite side of the street are  $30^\circ$  and  $60^\circ$  respectively. Find the height of the opposite house and width of the street. (use  $\sqrt{3} = 1.732$ ) **CBSE2010- 4M**
68. A vertical pedestal stands on the ground and is surmounted by a vertical flag staff of height 5 m. At a point on the ground the angles of elevation of the bottom and top of the flag staff are  $30^\circ$  and  $60^\circ$  respectively. Find the height of the pedestal. **CBSE2010- 4M**
69. Two poles of equal height are standing opposite to each other on either side of the road, which is 100 m wide. From a point between them on road, the angles of elevation of the top of the poles are  $60^\circ$  and  $30^\circ$ , respectively. Find the height of the poles. **CBSE2011- 4M**
70. The shadow of a tower standing on a level ground is found to be 30 m longer when the sun's altitude is  $30^\circ$  than when it is  $60^\circ$ . Find the height of the tower. **CBSE2011- 4M**
71. The angles of elevation and depression of the top and bottom of a light-house from the top of a 60 m building are  $30^\circ$  and  $60^\circ$  respectively. Find **CBSE2012- 4M**  
(a) the difference between heights of light-house and building.  
(b) the distance between the light-house and building.

72. The angle of elevation of the top of a hill at the foot of tower is  $60^\circ$  and angle of depression from the top of the tower of the foot of the hill is  $30^\circ$ . If the tower height is 50 m, find the height of the hill. **CBSE2012- 4M**
73. The angle of elevation of the top of a building from the foot of the tower is  $30^\circ$  and the angle of elevation of the top of a tower from the foot of the building is  $60^\circ$ . If the tower is 60 m height, find the height of the building. **CBSE2013- 4M**
74. The angles of elevation and depression of the top and bottom of a tower from the top of a 60 m building are  $30^\circ$  and  $60^\circ$  respectively. Find the difference between the heights of building and the tower and also the distance between them. **CBSE2014- 4M**
75. The angle of elevation of the top of a tower at a distance of 120 m from a point A on the ground is  $45^\circ$ . If the angle of elevation of the top of a flagstaff fixed at the top of the tower, at A is  $60^\circ$ , then find the height of the flagstaff. (use  $\sqrt{3} = 1.732$ ) **CBSE2014- 4M**
76. From a point P on the ground the angle of elevation of the top of the tower is  $30^\circ$  and that of the top of a staff flag fixed on the top of tower is  $60^\circ$ . If the length of the flag staff is 5 m, find the height of the tower. **CBSE2015- 4M**
77. At a point A, 20 metres above the level of water in a lake, the angle of elevation of a cloud is  $30^\circ$ . The angle of depression of the reflection of the cloud in the lake, at A is  $60^\circ$ . Find the distance of the cloud from A. **CBSE2015- 4M**
78. A bird is sitting on the top of a 80 m high tree. From a point on the ground, the angle of elevation of the bird is  $45^\circ$ . The bird flies away horizontally in such a way that it remained at a constant height from the ground. After 2 seconds, the angle of elevation of the bird from the same point is  $30^\circ$ . Find the speed of flying of the bird. (use  $\sqrt{3} = 1.732$ ) **CBSE2016- 4M**
79. 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 Flag staff are  $60^\circ$  and  $30^\circ$  respectively. Find the height of the tower and the distance of the point from the tower. (use  $\sqrt{3} = 1.732$ ) **CBSE2016- 4M**
80. An aeroplane is flying at a height of 300 m above the ground. Flying at this height, the angles of depression from the aeroplane of two points on both banks of a river in opposite directions are  $45^\circ$  and  $60^\circ$  respectively. Find the width of the river. (use  $\sqrt{3} = 1.732$ ) **CBSE2017- 4M**
81. The angle of elevation of a cloud from a point 60 m above the surface of the water of a lake is  $30^\circ$  and the angle of depression of its shadow in water of lake is  $60^\circ$ . Find the height of the cloud from the surface of water. **CBSE2017- 4M**
82. As observed from the top of a 100 m high light house from the sea-level, the angles of depression of two ships are  $30^\circ$  and  $45^\circ$ . If one ship is exactly behind the other on the same side of the light house, find the distance between the two ships. **CBSE2018- 4M**
83. A statue, 1.46 m tall, stands on a pedestal. From a point on the ground the angle of elevation of the top of the statue is  $60^\circ$  and from the same point angle of elevation of the top of the pedestal is  $45^\circ$ . Find the height of the pedestal. **CBSE2018- 4M**

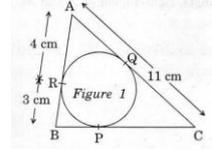
84. Prove that  $\frac{\sin A - 2\sin^3 A}{2\cos^3 A - \cos A} = \tan A$  **CBSE2018- 4M**
85. Prove that  $\left(\frac{\sin A}{1 - \cos A} - \frac{1 - \cos A}{\sin A}\right)\left(\frac{\cos A}{1 - \sin A} - \frac{1 - \sin A}{\cos A}\right) = 4$  **CBSE2018- 4M**
86. The angle of elevation of the top of a hill at the foot of a tower is  $60^\circ$  and the angle of depression from the top of tower to the foot of hill is  $30^\circ$ . If tower is 50 metre high, find the height of the hill. **CBSE2018- 4M**
87. 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 in between them on the road, the angles of elevation of the top of poles are  $60^\circ$  and  $30^\circ$  respectively. Find the height of the poles and the distances of the point from the poles. **CBSE2018- 4M**
88. On a horizontal plane there is a vertical tower with a flag pole on the top of the tower. From a point 9 m away from the foot of the tower, the angles of elevation of the top and foot of the flag pole are  $60^\circ$  and  $30^\circ$  respectively. Find the heights of the tower and the flag pole mounted on it. **CBSE2018- 4M**
89. Show that  $n(m^2 - 1) = 2m$ , if  $m = \sin \theta + \cos \theta$  and  $n = \sec \theta + \operatorname{cosec} \theta$ . **CBSE2018- 4M**

**CLASS X: CIRCLES**  
**(PREVIOUS YEARS BOARD QUESTIONS)**

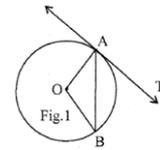
1. In Fig. 1, CP and CQ are tangents to a circle with centre O. ARB is another tangent touching the circle at R. If CP = 11 cm, and BC = 7 cm, then find the length of BR. **(CBSE 2009-1M)**



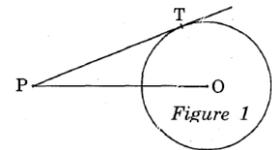
2. In Figure 1, 6. ABC is circumscribing a circle. Find the length of BC. **(CBSE 2009-1M)**



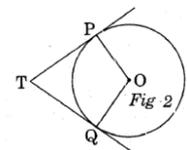
3. In Fig 1, O is the centre of circle, AB is chord and AT is tangent at A. If angle AOB is  $100^\circ$  then find measure of angle BAT. **(CBSE 2011-1M)**



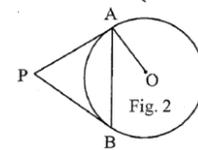
4. In Fig 1, point P is 26 cm away from the centre O of a circle and the length of tangent drawn from P is 24 cm. Find the radius of circle. **(CBSE 2011-1M)**



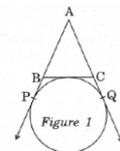
5. In Fig 2, TP and TQ are tangents drawn to a circle with centre O such that angle POQ is  $110^\circ$ . Find measure of angle PTQ. **(CBSE 2011-1M)**



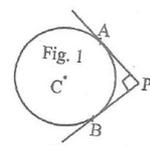
6. In Fig 2, PA & PB are tangents to the circle with centre O. If angle APB is  $60^\circ$  then find measure of angle OAB. **(CBSE 2011-1M)**



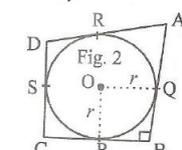
7. In fig 1, AP, AQ and BC are tangents to the circle. If AB=5 cm, AC= 6 cm & BC= 4 cm. Find length of AP. **(CBSE 2011-1M)**



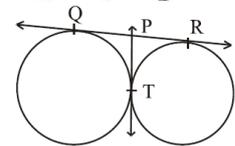
8. In fig 1, PA & PB are tangents and radius of circle is 4 cm. If  $PA \perp PB$  then find the length of each tangent. **(CBSE 2013-1M)**



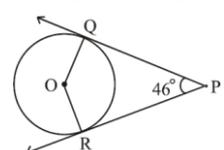
9. In fig 2, if AB=29 cm, AD=23 cm, angle B =  $90^\circ$  and DS=5 cm then find the radius of circle. **(CBSE 2013-1M)**



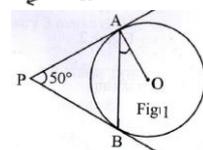
10. In fig 1, if PT=3.8 cm then find the length of QR. **(CBSE 2014-1M)**



11. In fig 2, if  $\angle QPR=46^\circ$ , find  $\angle QOR$ . **(CBSE 2014-1M)**



12. In fig1,  $\angle APB=50^\circ$ , find  $\angle OAB$ . **(CBSE 2015-1M)**



13. In fig1, if AB is a diameter and  $\angle CAB=30^\circ$ , find  $\angle PCA$ . (CBSE 2016-1M)

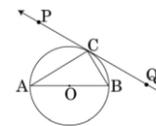


Figure 1

14. If the diameter of a semicircular protractor is 14 cm, then find its perimeter. (CBSE 2009-1M)

15. Two circles touch each other externally at P. AB is a common tangent to the circles touching them at A and B. Find the value of  $\angle APB$ . (CBSE 2014-1M)

16. In a right triangle ABC, right angled at B,  $BC=12$  cm &  $AB=5$  cm. Find the radius of the circle inscribed in the triangle. (CBSE 2014-1M)

17. If the angle between two tangents drawn from an external point P to a circle of radius a and centre O, is  $60^\circ$ , then find the length of OP. (CBSE 2017-1M)

18. From point Q, 13 cm away from the centre of circle, the length of tangent PQ to the circle is 12 cm. Find the radius of the circle. (CBSE 2012-1M)

19. ABC is an isosceles triangle, in which  $AB = AC$ , circumscribed about a circle. Show that BC is bisected at the point of contact. (CBSE 2008-2M)

20. Two concentric circles of radius r and 7 cm respectively where  $r > 7$ . A chord of larger circle of length 48 cm touches the smaller circle. Find value of r. (CBSE 2011-2M)

21. Prove that line segment joining two point of contacts of two parallel tangents of a circle passes through its centre. (CBSE 2014-2M)

22. If from an external point P of a circle with centre O, two tangents PQ and PR are drawn such that  $\angle QPR=120^\circ$ , prove that  $2PQ=PO$ . (CBSE 2014-2M)

23. Prove that the tangents drawn at the end points of a chord of a circle make equal angles with the chord. (CBSE 2017-2M)

24. A circle touches all the four sides of a quadrilateral ABCD. Prove that  $AB + CD = BC + DA$ . (CBSE 2017-2M)

25. If all the sides of a parallelogram touch a circle show that the parallelogram is a rhombus. (CBSE 2010 & 2013-2M)

26. In Fig. 5, a circle is inscribed in a quadrilateral ABCD in which  $\angle B = 90^\circ$ . If  $AD = 23$  cm,  $AB = 29$  cm and  $DS = 5$  cm, find the radius (r) of the circle. (CBSE 2008-2M)

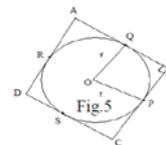
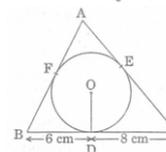
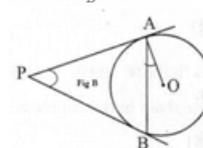


Fig.5

27. In fig 2, triangle ABC is drawn circumscribing a circle of radius 3 cm, such that segments BD and DC into which BC is divided by the point of contact D are of lengths 6 cm and 8 cm respectively. Find side AB if the area of triangle ABC is  $63 \text{ cm}^2$ . (CBSE 2010-2M)



28. In fig B, two tangents PA and PB are drawn to a circle with centre O from an external point P. Prove that angle  $APB = 2$  angle OAB. (CBSE 2009-2M)



29. In fig 3, right triangle ABC, circumscribes a circle of radius r. If AB and BC are of lengths 8 cm and 6 cm respectively. Find value of r. (CBSE 2012-2M)

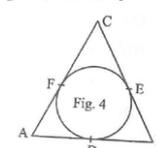
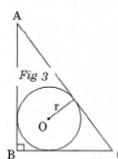


Fig. 4

30. In fig 4,  $AB=12$  cm,  $BC=8$  cm &  $AC=10$  cm then find lengths of AD, BE and CF. (CBSE 2013-2M)

31. In fig 1, common tangents AB and CD to the two circles with centres  $O_1$  and  $O_2$  intersect at E. Prove that  $AB=CD$ . (CBSE 2014-2M)

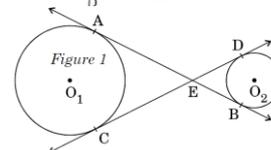
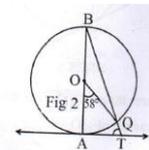
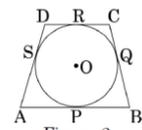


Figure 1

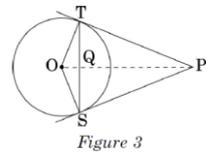
32. In fig2, AB is diameter of circle with centre O and AT is a tangent. If  $\angle AOQ=58^\circ$ , find  $\angle ATQ$ . **(CBSE 2015-2M)**



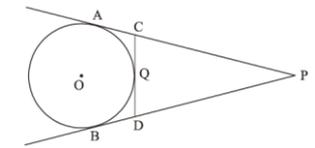
33. In fig2, prove that  $AB+CD=BC+DA$ . **(CBSE 2016-2M)**



34. In fig3, radius of circle is r. If  $OP=2r$  show that  $\angle OTS=\angle OST=30^\circ$ . **(CBSE 2016-2M)**



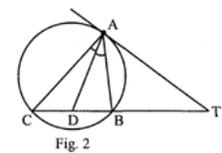
35. In the given figure, PA and PB are tangents to the circle from an external point P. CD is another tangent touching the circle at Q. If  $PA = 12$  cm,  $QC = QD = 3$  cm, then find  $PC + PD$ . **(CBSE 2017-2M)**



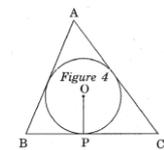
36. Prove that tangents drawn at the end of diameter of a circle are parallel to each other. **(CBSE 2012, 2017-2M)**

37. The in-circle 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 2014-2M)**

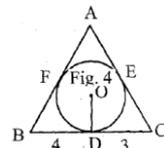
38. In fig 2, TA is a tangent to the circle from a point T and TBC is a secant to the circle. If AD is the bisector of  $\angle CAB$ , prove that  $\triangle ADT$  is isosceles. **(CBSE 2007-3M)**



39. In fig 4, triangle ABC is drawn circumscribing a circle of radius 10 cm, such that segments BD and DC into which BC is divided by the point of contact D are of lengths 15 cm and 20 cm respectively. Find side AB & AC if the area of triangle ABC is  $525 \text{ cm}^2$ . **(CBSE 2011-3M)**



40. In fig 4, triangle ABC is drawn circumscribing a circle of radius 2 cm, such that segments BD and DC into which BC is divided by the point of contact D are of lengths 4 cm and 3 cm respectively. Find side AB if the area of triangle ABC is  $21 \text{ cm}^2$ . **(CBSE 2011-2M)**



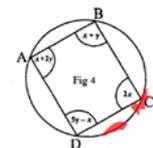
41. In ABC,  $AD \perp BC$  and  $AD^2 = BD \cdot DC$ . Prove that  $\angle BAC$  is a right angle. **(CBSE 2007-3M)**

42. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that  $\angle PTQ = 2 \angle OPQ$ . **(CBSE 2017-3M)**

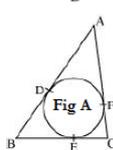
43. Prove that the lengths of the tangents drawn from an external point to a circle are equal. **(CBSE 2011 & 2012-4M, 2018-2M)**

44. Prove that tangent at any point of a circle is perpendicular to the radius at the point of contact. **(CBSE 2013-4M)**

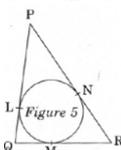
45. Prove that the sum of either pair of opposite angles of a cyclic quadrilateral is  $180^\circ$ . Using the above, find x and y in Fig. 4. **(CBSE 2007-5M)**



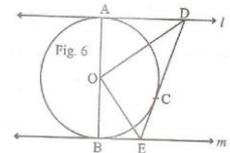
46. In figure A, a circle is inscribed in a triangle ABC having side  $BC = 8$  cm,  $AC = 10$  cm and  $AB = 12$  cm. Find AD, BE and CF. **(CBSE 2009-3M)**



47. In fig 5, a circle is inscribed in a triangle PQR with  $PQ=10$  cm,  $QR=8$  cm &  $PR=12$  cm. Find lengths of QM, RN and PL. **(CBSE 2012-3M)**



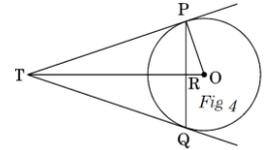
48. In fig 6,  $l$  and  $m$  are two parallel tangents to a circle with centre  $O$  touching the circle at  $A$  and  $B$  respectively. Another tangent at  $C$  intersects the line  $l$  at  $D$  and  $m$  at  $E$ . Prove that angle  $DOE$  is  $90^\circ$ . **(CBSE 2013-4M)**



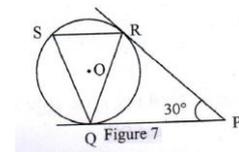
49. Prove that the lengths of the tangents drawn from an external point to a circle are equal. Using the above theorem prove that: If quadrilateral  $ABCD$  is circumscribing a circle, then  $AB + CD = AD + BC$ . **(CBSE 2009-6M)**

50. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact. **(CBSE 2014, 2015-4M)**

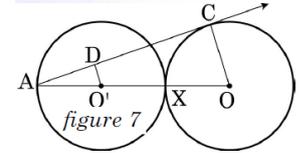
51. In Figure 4,  $PQ$  is a chord of length 16 cm, of a circle of radius 10 cm. The tangents at  $P$  and  $Q$  intersect at a point  $T$ . Find the length of  $TP$ . **(CBSE 2014-4M)**



52. In fig7,  $\angle RPQ = 30^\circ$  &  $RS$  is parallel to  $PQ$  then, find  $\angle RQS$ . **(CBSE 2015-4M)**



53. In fig7, two equal circles with centres  $O$  and  $O'$  touch each other at  $X$ .  $OO'$  produced meets the circles 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  $DO'/CO$ . **(CBSE 2016-4M)**



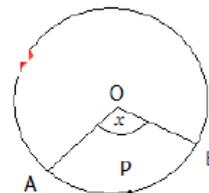
**CLASS X: CONSTRUCTIONS**  
**(PREVIOUS YEARS BOARD QUESTIONS)**

1. Construct a  $\triangle ABC$  in which  $AB = 6.5$  cm, angle  $B = 60^\circ$ , and  $BC = 5.5$  cm. Also construct a triangle  $A'B'C'$  similar to  $\triangle ABC$ , whose each side is  $\frac{3}{2}$  times the corresponding side of the  $\triangle ABC$ . **(CBSE 2007-3M)**
2. Construct  $\triangle ABC$  in which  $BC = 6.5$  cm,  $AB = 4.5$  cm and  $\angle ABC = 60^\circ$ . Construct a triangle similar to this triangle whose sides are  $\frac{3}{4}$  of the corresponding sides of the triangle  $ABC$ . **(CBSE 2009-3M)**
3. Draw a right triangle in which sides (other than hypotenuse) are of lengths 8 cm and 6 cm. Then construct another triangle whose sides are  $\frac{3}{4}$  times the corresponding sides of the first triangle. **(CBSE 2009-3M)**
4. Draw a circle of radius 3 cm. From a point  $P$ , 6 cm away from its centre, construct a pair of tangents to the circle. Measure the lengths of the tangents. **(CBSE 2009-3M)**
5. Construct  $\triangle ABC$  in which  $BC = 8$  cm,  $\angle B = 45^\circ$  and  $\angle C = 30^\circ$ . Construct a triangle similar to this triangle whose sides are  $\frac{3}{4}$  of the corresponding sides of the triangle  $ABC$ . **(CBSE 2010-3M)**
6. Draw a circle of radius 3 cm. From a point  $P$ , 7 cm away from its centre, construct a pair of tangents to the circle. Also, measure the lengths of the tangents. **(CBSE 2010-3M)**
7. Construct  $\triangle ABC$  in which  $BC = 6$  cm,  $AB = 5$  cm and  $\angle ABC = 60^\circ$ . Construct a triangle similar to this triangle whose sides are  $\frac{5}{7}$  of the corresponding sides of the triangle  $ABC$ . **(CBSE 2011-3M)**
8. 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 other circle. **(CBSE 2011-3M)**
9. Construct an isosceles triangle whose base is 8 cm and altitude is 4 cm and then construct another similar triangle to it whose sides are  $\frac{3}{4}$  of the corresponding sides of the isosceles triangle. **(CBSE 2011-3M)**
10. Construct  $\triangle ABC$  in which  $BC = 7$  cm,  $\angle B = 45^\circ$  and  $\angle C = 60^\circ$ . Construct a triangle similar to this triangle whose sides are  $\frac{3}{5}$  of the corresponding sides of the triangle  $ABC$ . **(CBSE 2011-3M)**
11. Draw a right triangle in which sides (other than hypotenuse) are of lengths 8 cm and 6 cm. Then construct another triangle whose sides are  $\frac{3}{5}$  times the corresponding sides of the first triangle. **(CBSE 2009-3M)**
12. Construct a triangle with sides as 5 cm, 4 cm and 6 cm. Then construct another triangle whose sides are  $\frac{2}{3}$  times the corresponding sides of the first triangle. **(CBSE 2013-3M)**
13. Draw two concentric circles of radii 2 cm and 5 cm. Taking a point on outer circle, construct the pair of tangents to the other. Also, measure the length of tangent. **(CBSE 2013-3M)**
14. Construct a right triangle  $ABC$  in which  $AB = 6$  cm,  $\angle B = 90^\circ$  and  $BC = 8$  cm. Draw  $BD$  perpendicular from  $B$  on  $AC$  and draw a circle passing through the points  $B$ ,  $C$  and  $D$ . Construct tangents from  $A$  to the circle. **(CBSE 2014-3M)**
15. Construct a triangle with sides as 5 cm, 5.5 cm and 6.5 cm. Then construct another triangle whose sides are  $\frac{3}{5}$  times the corresponding sides of the given triangle. **(CBSE 2014-3M)**
16. Draw a circle of radius 3 cm. From a point  $P$ , 7 cm away from its centre, construct a pair of tangents to the circle. Measure the lengths of the tangents. **(CBSE 2015-4M)**
17. Construct a right triangle  $ABC$  in which  $AB = 7$  cm,  $\angle B = 60^\circ$  and  $BC = 6$  cm. Then construct another triangle whose sides are  $\frac{3}{4}$  times the corresponding sides of the given triangle. **(CBSE 2015-4M)**
18. Construct  $\triangle ABC$  in which  $AB = 6$  cm,  $\angle A = 30^\circ$  and  $\angle B = 60^\circ$ . Construct another  $\triangle A'B'C'$  similar to  $\triangle ABC$  with base  $A'B' = 8$  cm. **(CBSE 2015-4M)**
19. Draw two concentric circles of radii 3 cm and 5 cm. Construct tangent to smaller circle from a point on larger circle. Also, measure the length of tangent. **(CBSE 2016, 2017-4M)**
20. Construct a triangle with sides as 5 cm, 4 cm and 6 cm. Then construct another triangle whose sides are  $\frac{3}{5}$  times the corresponding sides of the first triangle. **(CBSE 2016-4M)**

21. Draw a circle of radius 4 cm. Draw tangents to the circle inclined at angle of  $60^\circ$  to each other. **(CBSE 2016-4M)**
22. Construct  $\triangle ABC$  in which  $BC = 7$  cm,  $\angle A = 105^\circ$  and  $\angle B = 45^\circ$ . Then construct another triangle whose sides are  $\frac{3}{4}$  times the corresponding sides of the first triangle. **(CBSE 2017-4M)**
23. Construct an isosceles triangle with base 8 cm and altitude 4 cm. Then construct another triangle whose sides are  $\frac{2}{3}$  times the corresponding sides of the isosceles triangle. **(CBSE 2017-4M)**
24. Draw a triangle ABC with  $BC = 6$  cm,  $AB = 5$  cm and  $\angle B = 60^\circ$ . Then construct a triangle whose sides are  $\frac{3}{4}$  of the corresponding sides of the triangle ABC. **(CBSE 2018-4M)**

**CLASS X: AREAS RELATED TO CIRCLES & SURFACE AREAS AND VOLUMES**  
**(PREVIOUS YEARS BOARD QUESTIONS)**

1. In Fig., O is the centre of a circle. The area of sector OAPB is  $\frac{5}{18}$  of the area of the circle. Find x. **CBSE2008-1M**



2. A cylinder and a cone are of same base radius and of same height. Find the ratio of the volume of cylinder to that of the cone. **CBSE2009-1M**
3. The slant height of a frustum of a cone is 4 cm and the perimeters (circumferences) of its circular ends are 18 cm and 6 cm. Find the curved surface area of the frustum.

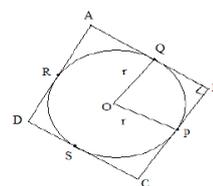
$$\pi = \frac{22}{7} \quad \text{CBSE2010-1M}$$

4. If the area of a circle is equal to area of two circles of radii 3 cm and 4 cm then find the radius of the larger circle. **CBSE2011-1M**
5. A sphere of diameter 18 cm is dropped into cylindrical vessel of diameter 36 cm, partly filled with water. If the sphere is completely submerged then find the rise in water level. **CBSE2011-1M**
6. If the radius of the base of right circular cylinder is halved, keeping the height same, then find the ratio of the volume of the cylinder thus obtained to the volume of the original cylinder. **CBSE2012-1M**
7. If the area of a circle is equal to area of two circles of diameters 10 cm and 24 cm then find the diameter of the larger circle. **CBSE2012-1M**
8. If the difference between radius and the circumference of a circle is 37 cm, then using

$$\pi = \frac{22}{7} \quad \text{find circumference of circle. CBSE2013-1M}$$

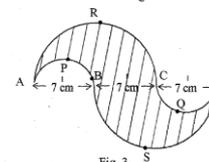
9. A chord of a circle of radius 10 cm subtends a right angle at its centre. Find the length of the chord (in cm). **CBSE2014-1M**
10. Two cubes have their volumes in the ratio 1: 27. Find the ratio of their surface areas. **CBSE2018-1M**

11. In Fig, a circle is inscribed in a quadrilateral ABCD in which  $\angle B = 90^\circ$ . If AD = 23 cm, AB = 29 cm and DS = 5 cm, find the radius (r) of the circle. **CBSE2008-2M**



12. In fig, APB and CQD are semi-circles with diameter 7 cm each, while ARC and BSD are semi-circles with diameter 14 cm each. Find the perimeter of shaded region. **CBSE2011-2M**

$$\pi = \frac{22}{7}$$



13. Find the area of a quadrant of a circle whose circumference is 44 cm. **CBSE2011-2M**
- $$\pi = \frac{22}{7}$$

14. Two cubes, of side 4 cm are joined to each other side by side. Find the surface area of the resulting cuboid. **CBSE2011-2M**

15. The volume of a hemisphere is  $2425\frac{1}{2} \text{ cm}^3$ . Find its curved surface area.

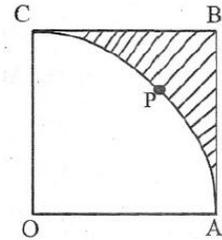
**CBSE2012-2M**

16. Two circular pieces of equal radii and maximum area, touching each other are cut from a rectangular card board of dimensions 14 cm by 7 cm. Find the area of

remaining card board. (Use  $\pi = \frac{22}{7}$ ) **CBSE2013-2M**

17. In fig, OABC is a square of side 7 cm. If OAPC is quadrant of a circle with centre O, find the area of shaded region.

(Use  $\pi = \frac{22}{7}$ ) **CBSE2013-2M**



18. If the total surface area of a solid hemisphere is  $462 \text{ cm}^2$ , find its volume.

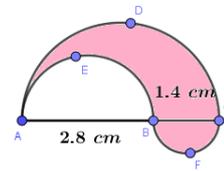
(Use  $\pi = \frac{22}{7}$ ) **CBSE2014-2M**

19. 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. **CBSE2018-2M**

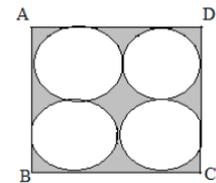
20. A toy is in the form of a cone mounted on a hemisphere of common base radius 7 cm. The total height of the toy is 31 cm. Find the total surface area of the toy.

(Use  $\pi = \frac{22}{7}$ ) **CBSE2007-3M**

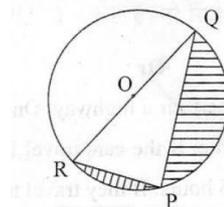
21. In Fig., find the perimeter of shaded region where ADC, AEB and BFC are semicircles on diameters AC, AB and BC respectively. **CBSE2008-3M**



22. Find the area of the shaded region in Fig., where ABCD is square of side 14 cm. **CBSE2008-3M**

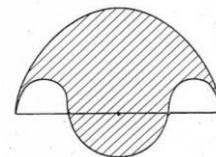


23. In Fig, PQ = 24 cm, PR = 7 cm and O is the centre of the circle. Find the area of shaded region (take  $\pi = 3.14$ ) **CBSE2009-3M**



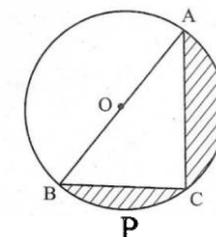
24. In Fig., the boundary of shaded region consists of four semicircular arcs, two smallest being equal. If diameter of the largest is 14 cm and that of the smallest is 3.5 cm, calculate

the area of the shaded region. (Use  $\pi = \frac{22}{7}$ ) **CBSE2010-3M**

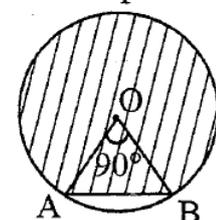


25. Find the area of the shaded region in Fig. , if AC = 24 cm, BC = 10 cm and O is the centre of the circle.

[Use  $\pi = 3.14$ ] **CBSE2010-3M**

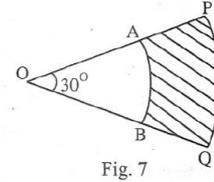


26. Find the area of major segment in the figure where radius of circle is 35 cm and  $\angle AOB = 90^\circ$ . (Use  $\pi = \frac{22}{7}$ ) **CBSE2011-3M**



27. The radii of a circular ends of a bucket of height 15 cm are 14 cm and  $r$  cm ( $r < 14$  cm). If the volume of bucket is  $5390 \text{ cm}^3$ , find the value of  $r$ . (Use  $\pi = \frac{22}{7}$ ) **CBSE2011-3M**

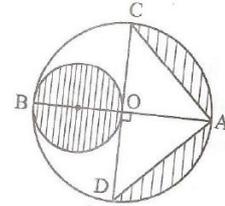
28. In fig, PQ and AB are respectively arcs of two concentric circles of radius 7 cm and 3.5 cm with centre O. If  $\angle POQ = 30^\circ$ , find the area of shaded region. **CBSE2012-3M**



29. From a solid cylinder of height 7 cm and base diameter of 12 cm, a conical cavity of same height and same base diameter is hollowed out. Find the total surface area of the remaining solid. (Use  $\pi = \frac{22}{7}$ ) **CBSE2012-3M**

30. A cylindrical bucket with 32 cm height is filled with sand and base radius is 18 cm. This sand is converted to a conical heap on the ground whose height is 24 cm then find the radius and slant height of the heap. **CBSE2012-3M**

31. In fig, AB and CD are two diameters of circles with centre O, which are perpendicular to each other. OB is the diameter of smaller circle. If  $OA = 7 \text{ cm}$ , find the area of shaded region. **CBSE2013-3M**

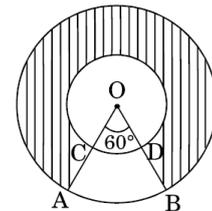


32. A vessel is in the form of a hemispherical bowl surmounted by hollow cylinder of same diameter. The diameter of hemi spherical bowl is 14 cm and total height of vessel is 13 cm. Find the total surface area of the vessel. (Use  $\pi = \frac{22}{7}$ ) **CBSE2013-3M**

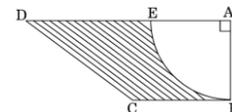
33. A wooden toy was made by scooping out a hemisphere of same radius from each end of a solid cylinder. If the height of the cylinder is 10 cm, and its base radius is 3.5 cm, find the volume of the wood in the toy. (Use  $\pi = \frac{22}{7}$ ) **CBSE2013-3M**

34. In a circle of radius 21 cm, an arc subtends an angle of  $60^\circ$  at the centre. Find (i) the length of the arc. (ii) area of sector formed by arc. (Use  $\pi = \frac{22}{7}$ ) **CBSE2013-3M**

35. In Figure 2, two concentric circles with centre O, have radii 21 cm and 42 cm. If  $\angle AOB = 60^\circ$  find the area of the shaded region. (Use  $\pi = \frac{22}{7}$ ) **CBSE2014-3M**



36. In Figure 3, ABCD is a trapezium of area 24.5 sq. cm. In it,  $AD \parallel BC$ ,  $\angle DAB = 90^\circ$ ,  $AD = 10 \text{ cm}$  and  $BC = 4 \text{ cm}$ . If ABE is a quadrant of a circle, find the area of the shaded region.



(Use  $\pi = \frac{22}{7}$ ) **CBSE2014-3M**

37. The largest possible sphere is carved out of a wooden solid cube of side 7 cm. Find the volume of the wood left. **CBSE2014-3M**

38. Water in a canal, 6 m wide and 1.5 m deep, is flowing at a speed of 4 km/h. How much area will it irrigate in 10 minutes, if 8 cm of standing water is needed for irrigation? **CBSE2014-3M**

39. Find the area of the minor segment of a circle of radius 14 cm, when its central angle is  $60^\circ$ . Also find the area of the corresponding major segment. (Use  $\pi = \frac{22}{7}$ )

**CBSE2015-3M**

40. Due to sudden floods, some welfare associations jointly requested the government to get 100 tents fixed immediately and offered to contribute 50% of the cost. If the lower part of each tent is of the form of a cylinder of diameter 4.2 m and height 4 m with the conical upper part of same diameter but of height 2.8 m, and the canvas to be used costs Rs. 100 per sq. m, find the amount, the associations will have to pay. What values are shown by these associations? (Use  $\pi = \frac{22}{7}$ ) **CBSE2015-3M**

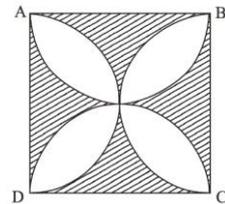
41. A hemispherical bowl of internal diameter 36 cm contains liquid. This liquid is filled into 72 cylindrical bottles of diameter 6 cm. Find the height of the each bottle, if 10% liquid is wasted in this transfer. **CBSE2015-3M**

42. A cubical block of side 10 cm is surmounted by a hemisphere. What is the largest diameter that the hemisphere can have? Find the cost of painting the total surface area of the solid so formed, at the rate of Rs. 5 per 100 sq. cm. (Use  $\pi = 3.14$ ) **CBSE2015-3M**

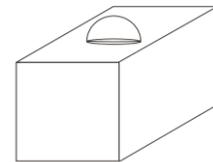
43. 504 cones, each of diameter 3.5 cm and height 3 cm, are melted and recast into a metallic sphere. Find the diameter of the sphere and hence find its surface area.

(Use  $\pi = \frac{22}{7}$ ) **CBSE2015-3M**

44. In Fig. 4, ABCD is a square of side 14 cm. Semi-circles are drawn with each side of square as diameter. Find the area of the shaded region. (Use  $\pi = \frac{22}{7}$ ) **CBSE2016-3M**

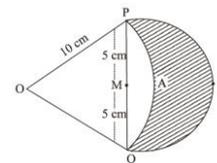


45. In Fig. 5, is a decorative block, made up of two solids - a cube and a hemisphere. The base of the block is a cube of side 6 cm and the hemisphere fixed on the top has a diameter of 3.5 cm. Find the total surface area of the block. (Use  $\pi = \frac{22}{7}$ )



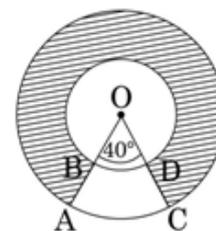
**CBSE2016-3M**

46. In Fig. 7, are shown two arcs PAQ and PBQ. Arc PAQ is a part of circle with centre O and radius OP while arc PBQ is a semi-circle drawn on PQ as diameter with centre M. If  $OP = PQ = 10$  cm show that area of shaded region is  $25(\sqrt{3} - \frac{\pi}{6}) \text{ cm}^2$ .

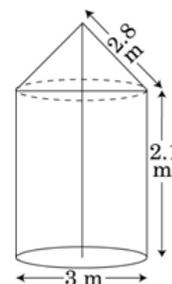


**CBSE2016-3M**

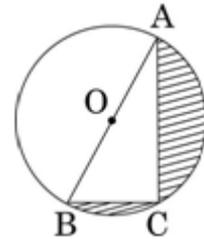
47. In fig. 6, find the area of the shaded region, enclosed between two concentric circles of radii 7 cm and 14 cm where  $\angle AOC = 40^\circ$ . **CBSE2016-3M**



48. In fig. 5, a tent is in the shape of a cylinder surmounted by a conical top of same diameter. If the height and diameter of cylindrical part are 2.1 m and 3 m respectively and the slant height of conical part is 2.8 m, find the cost of canvas needed to make the tent if the canvas is available at the rate of Rs. 500/sq.metre. (Use  $\pi = \frac{22}{7}$ ) **CBSE2016-3M**



49. In fig.4, 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  $\pi=3.14$ ) **CBSE2016-3M**

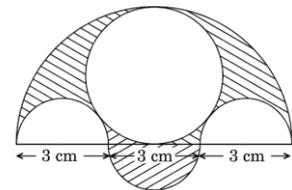


50. A well of diameter 4 m is dug 21 m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 3 m to form an embankment. Find the height of the embankment. **CBSE2016-3M**
51. A conical vessel, with base radius 5 cm and height 24 cm, is full of water. This water is emptied into a cylindrical vessel of base radius 10 cm. Find the height to which the water will rise in the cylindrical vessel. **CBSE2016-3M**
52. 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.

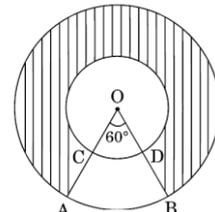
**CBSE2016-3M**

53. The sum of the radius of base and height of a solid right circular cylinder is 37 cm. If the total surface area of the solid cylinder is 1628 sq. cm, find the volume of the cylinder. (Use  $\pi = \frac{22}{7}$ ) **CBSE2016-3M**

54. Three semicircles each of diameter 3 cm, a circle of diameter 4.5 cm and a semicircle of radius 4.5 cm are drawn in the given figure. Find the area of the shaded region. **CBSE2017-3M**



55. In the given figure, two concentric circles with centre O have radii 21 cm and 42 cm. If  $\angle AOB = 60^\circ$ , find the area of the shaded region. (Use  $\pi = \frac{22}{7}$ ) **CBSE2017-3M**



56. 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? **CBSE2017-3M**
57. From a solid cylinder whose height is 8 cm and radius 6 cm, a conical cavity of same height and same base radius is hollowed out. Find the total surface area of the remaining solid. (Use  $\pi = 3.14$ ) **CBSE2017-3M**
58. A wire when bent in the form of an equilateral triangle encloses an area of  $121\sqrt{3}$  cm<sup>2</sup>. If the wire is bent in the form of a circle, find the area enclosed by the circle. (Use  $\pi = \frac{22}{7}$ ) **CBSE2017-3M**
59. 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 for irrigation? **CBSE2017-3M**
60. The slant height of a frustum of a cone is 4 cm and the perimeters of its circular ends are 18 cm and 6 cm. Find the curved surface area of the frustum. **CBSE2017-3M**

61. The dimensions of a solid iron cuboid are  $4.4 \text{ m} \times 2.6 \text{ m} \times 1.0 \text{ m}$ . 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. **CBSE2017-3M**
62. Rampal decided to donate canvas for 10 tents, conical in shape with base diameter 14 m and height 24 m to a centre for handicapped persons' welfare. If the cost of 2 m wide canvas is Rs.40 per metre, find the amount by which Rampal helped the centre. **CBSE2017-3M**
63. In Fig. 4, ABCD is a trapezium with  $AB \parallel DC$  and  $\angle BCD = 30^\circ$ . If BGEC is a sector of a circle with centre C and  $AB = BC = 7 \text{ cm}$ ,  $DE = 4 \text{ cm}$  and  $BF = 3.5 \text{ cm}$ , then find the area of the shaded region. (Use  $\pi = \frac{22}{7}$ ) **CBSE2017-3M**
64. Find the area of the shaded region in Fig. 2, 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  $\pi = 3.14$ ] **CBSE2018-3M**
65. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in Fig. 3. If the height of the cylinder is 10 cm and its base is of radius 3.5 cm. Find the total surface area of the article. **CBSE2018-3M**
66. A heap of rice is in the form of a cone of base diameter 24 m and height 3.5 m. Find the volume of the rice. How much canvas cloth is required to just cover the heap? **CBSE2018-3M**
67. A chord of a circle, of radius 15 cm, subtends an angle of  $60^\circ$  at the centre of the circle. Find the area of major and minor segments (Take  $\pi = 3.14$ ,  $\sqrt{3} = 1.73$ ) **CBSE2018-3M**
68. 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 vessel rises by  $3\frac{5}{9} \text{ cm}$ . Find the diameter of the cylindrical vessel. **CBSE2018-3M**
69. A cylinder whose height is two-third of its diameter, has the same volume as that of a sphere of radius 4 cm. Find the radius of base of the cylinder. **CBSE2018-3M**
70. In a circle of radius 21 cm, an arc subtends an angle of  $60^\circ$  at the centre. Find (i) the length of the arc and (ii) area of sector formed by the arc. **CBSE2018-3M**
71. Four circular cylindrical vessels, each having a diameter 21 cm and height 38 cm are full of ice-cream. This ice-cream is to be filled in cones each of height 12 cm and diameter 7 cm, having a hemispherical shape on the top. Find the total number of cones that can be filled with the ice-cream. **CBSE2018-3M**
72. The diameters of the internal and external surfaces of a hollow spherical shell are 6 cm and 10 cm respectively. It is melted and recast into a solid cylinder of diameter 14 cm, find the height of the cylinder. **CBSE2018-3M**
73. 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. **CBSE2018-3M**
74. The side of a square is 10 cm. Find the area between inscribed and circumscribed circles of the square. **CBSE2018-3M**
75. 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

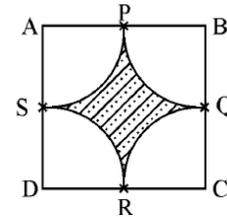
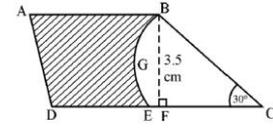


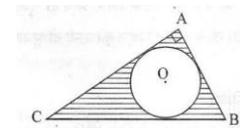
Fig. 3

cylindrical vessel rises by  $3\frac{5}{9}$  cm. Find the diameter of the cylindrical vessel.

**CBSE2007-4M**

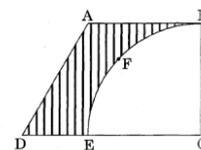
76. A solid right circular cone of diameter 14 cm and height 8 cm is melted to form a hollow sphere. If the external diameter of the sphere is 10 cm, find the internal diameter of the sphere. **CBSE2007-4M**
77. A bucket made up of a metal sheet is in the form of a frustum of a cone of height 16 cm with diameters of its lower and upper ends as 16 cm and 40 cm respectively. Find the volume of the bucket. Also find the cost of the bucket if the cost of metal sheet used is Rs 20 per 100 cm<sup>2</sup>. ( $\pi = 3.14$ ) **CBSE2008-4M**
78. 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 6 km/h., in how much time will the tank be filled? **CBSE2008-4M**
79. From a solid cylinder whose height is 8 cm and radius 6 cm, a conical cavity of height 8 cm and of base radius 6 cm, is hollowed out. Find the volume of the remaining solid correct to two places of decimals. Also find the total surface area of the remaining solid.  $\pi = 3.1416$  **CBSE2009-4M**

80. In Fig, ABC is a right triangle right angled at A. Find the area of shaded region if AB = 6 cm, BC = 10 cm and O is the centre of the in-circle of *triangle ABC*.



- ( $\pi = 3.14$ ) **CBSE2009-4M**
81. A milk container is made of metal sheet in the shape of frustum of a cone whose volume is  $10459\frac{3}{7}$  cm<sup>3</sup>. The radii of its lower and upper ends are 8 cm and 20 cm respectively. Find the cost of metal sheet used in making the container at the rate of Rs. 1.40 per square centimeter. (Use  $\pi = \frac{22}{7}$ ) **CBSE2010-4M**
82. A toy is in the form of a hemisphere surmounted by a right circular cone of the same base radius as that of the hemisphere. If the radius of base of cone is 21 cm and its volume is two third of the volume of the hemisphere, calculate the height of the cone and the surface area of the toy. (Use  $\pi = \frac{22}{7}$ ) **CBSE2010-4M**

83. From a thin metallic sheet a trapezium ABCD in which AB is parallel to CD and  $\angle BCD = 90^\circ$ , a quarter circle BFEC is removed. Given AB=BC= 3.5 cm, and DE= 2 cm, find the area of the remaining portion of metallic sheet. (Use  $\pi = \frac{22}{7}$ )



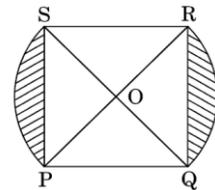
**CBSE2011-4M**

84. Water is flowing at the rate of 6km/h through a pipe of diameter 14 cm into rectangular tank of dimensions 60 m long and 22 m wide. Determine the time in which the level of water in tank will rise by 7 cm. (Use  $\pi = \frac{22}{7}$ ) **CBSE2011-4M**
85. A hollow sphere of internal and external diameters 4 cm and 8 cm respectively is melted to form a cone of base diameter 8 cm. Find the height and slant height of the cone. **CBSE2011-4M**
86. A solid is in the shape of cone surmounted on a hemisphere, the radius of each of them being 3.5 cm, total height of solid is 9.5 cm. Find the volume of the solid. (Use  $\pi = \frac{22}{7}$ ) **CBSE2012-4M**
87. A bucket is in the form of a frustum of a cone which can hold 28.49 litres of water. If the radii of its circular ends are 28 cm and 21 cm, find the height of the bucket.

(Use  $\pi = \frac{22}{7}$ ) **CBSE2012-4M**

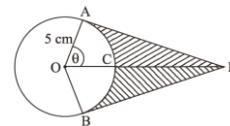
88. Water is flowing through a cylindrical pipe of inner diameter 2cm, into a cylindrical tank of base radius 40 cm, at the rate of 0.4 m/s. Determine the raise in the water level in the tank in half an hour. **CBSE2013-4M**
89. A bucket open at the top and made of metal sheet is in the form of frustum of a cone. The depth of bucket is 24 cm and diameters of upper and lower circular ends are 30 cm and 10 cm respectively. Find the cost of metal sheet used in it at the rate of Rs. 10 per  $\text{cm}^2$ . (Take  $\pi = 3.14$ ) **CBSE2013-4M**
90. 150 spherical marbles, each of diameter 1.4 cm, are dropped in a cylindrical vessel of diameter 7 cm containing some water, which are completely immersed in water. Find the rise in the level of water in the vessel. **CBSE2014-4M**
91. 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 Rs. 21 per litre. **CBSE2014-4M**

92. In Figure 5, PQRS is a square lawn with side PQ = 42 metres. Two circular flower beds are there on the sides PS and QR with centre at O, the intersection of its diagonals. Find the total area of the two flower beds (shaded parts). **CBSE2015-4M**

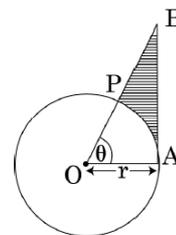


93. From each end of a solid metal cylinder, metal was scooped out in hemispherical form of same diameter. The height of the cylinder is 10 cm and its base is of radius 4.2 cm. The rest of the cylinder is melted and converted into a cylindrical wire of 1.4 cm thickness. Find the length of the wire. (Use  $\pi = \frac{22}{7}$ ) **CBSE2015-4M**

94. An elastic belt is placed around the rim of a pulley of radius 5 cm. (Fig. 10) From one point C on the belt, the elastic belt is pulled directly 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. (Take  $\pi = 3.14, \sqrt{3} = 1.73$ ) **CBSE2016-4M**



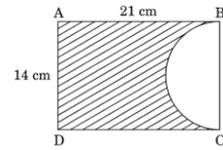
95. In Fig. 9, is shown a sector OAP of a circle with centre O, containing  $\angle \theta$ . AB is perpendicular to the radius OA and meets OP produced at B. Prove that the perimeter of shaded region is  $r(\tan \theta + \sec \theta + \frac{\pi \theta}{180^\circ} - 1)$  **CBSE2016-4M**



96. A bucket open at the top is in the form of a frustum of a cone with a capacity of  $12308.8 \text{ cm}^3$ . 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  $\pi = 3.14$ ) **CBSE2016-4M**
97. Due to heavy floods in a state, thousands were rendered homeless. 50 schools collectively offered to the state government to provide place and the canvas for 1500 tents to be fixed by the government and decided to share the whole expenditure equally. The lower part of each tent is cylindrical of base radius 2.8 m and height 3.5 m, with conical upper part of same base radius but of height 2.1 m. If the canvas used to make the tents costs Rs.120 per sq.m, find the amount shared by each school to set up the tents. What value is generated by the above problem? (Use  $\pi = \frac{22}{7}$ )

**CBSE2016-4M**

98. In the given figure, 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.



**CBSE2017-4M**

99. In a rain-water harvesting system, the rain-water from a roof of 22 m × 20 m drains into a cylindrical tank having diameter of base 2 m and height 3.5 m. If the tank is full, find the rainfall in cm. Write your views on water conservation. **CBSE2017-4M**
100. A solid metallic cylinder of diameter 12 cm and height 15 cm is melted and recast into toys each in the shape of a cone of radius 3 cm and height 9 cm. Find the number of toys so formed. **CBSE2017-4M**
101. A bucket, is in the form of frustum of a cone whose height is 42 cm and the radii of its circular ends are 30 cm and 10 cm. Find the amount of milk (in litres) which this bucket can hold. If the milkman sells the milk at the rate of Rs.40 per litre, what amount he will get from the sale? If the milkman sells half the milk at less rate to the economically weaker section of society, what value he exhibits by doing this? **CBSE2017-4M**
102. The diameters of the lower and upper ends of a bucket in the form of a frustum of a cone are 10 cm and 30 cm 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  $\pi = 3.14$ ] **CBSE2018-4M**
103. Sudhakar donated 3 cylindrical drums to store cereals to an orphanage. If radius of each drum is 0.7 m and height 2 m, find the volume of each drum. If each drum costs Rs.350 per  $m^3$ , find the amount spent by Sudhakar for orphanage. What value is exhibited in the question? (Use  $\pi = \frac{22}{7}$ ) **CBSE2018-4M**
104. A milkman uses a container, in the shape of frustum of a cone, to store milk. The container open from the top, is of height 40 cm with radii of its lower and upper circular ends as 14 cm and 35 cm respectively. Find the volume of milk (in litres) which can completely fill the container. If he sells the milk at Rs.35 per litre, for how much amount he can sell the whole milk? He had a desire to give one-tenth of the whole milk free to the children of economically weaker section of society. What value is reflected by his desire? (Use  $\pi = \frac{22}{7}$ ) **CBSE2018-4M**
105. 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 Rs. 42 per 100  $cm^2$ . Write your comments on the act of the man. **CBSE2018-4M**

**CLASS X: STATISTICS**  
**(PREVIOUS YEARS BOARD QUESTIONS)**

1. Write the median class of the following distribution : **CBSE2009-1M**

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	4	4	8	10	12	8	4

2. The mean of the following frequency distribution is 62.8. Find the missing frequency x. **CBSE2007-2M**

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

3. The enrolment of a secondary school in different classes is given below: **CBSE2007-3M**

Class	VI	VII	VIII	IX	X
Enrolment	600	500	400	700	200

Draw a pie chart to represent the above data.

4. The table below shows the salaries of 280 persons : **CBSE2018-3M**

Salary (in Thousand Rs.)	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
No. of Persons	49	133	63	15	6	7	4	2	1

Calculate the median salary of the data.

5. The following distribution gives the daily income of 50 workers of a factory :

Daily income (in Rs.)	100-120	120-140	140-160	160-180	180-200
No.of Workers	12	14	8	6	10

Find the mean and mode of the above data. **CBSE2018-3M**

6. By changing the following frequency distribution 'to less than type' distribution, draw its ogive. **CBSE2018-3M**

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

7. Find the median of the following distribution : **CBSE2018-3M**

Class	0-10	10-20	20-30	30-40	40-50
Frequency	8	12	10	11	9

8. 100 surnames were randomly picked up from a local telephone directory and the distribution of number of letters of the English alphabet in the surnames was obtained as follows: **CBSE2008-4M**

No.of Letters	1-4	4-7	7-10	10-13	13-16	16-19
No.of Surnames	6	30	40	16	4	4

Determine the median and mean number of letters in the surnames. Also find the modal size of surnames.

9. The following table gives the daily income of 50 workers of a factory : **CBSE2009-4M**

Daily income (in Rs.)	100-120	120-140	140-160	160-180	180-200
No. of Workers	12	14	8	6	10

Find the mean, median and mode of the data.

10. During the medical check-up of 35 students of a class their weights were recorded as follows : **CBSE2009-4M**

Weight (in kg)	38-40	40-42	42-44	44-46	46-48	48-50	50-52
No. of Students	3	2	4	5	14	4	3

Draw a less than type and a more than type ogive from the given data. Hence obtain the median weight from the graph.

11. Find the mean, median and mode of the data.: **CBSE2010-4M**

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	4	4	7	10	12	8	5

12. If the mean of the following frequency distribution is 65.6. Find the missing frequencies  $f_1$  and  $f_2$ . **CBSE2010-4M**

Class	10-30	30-50	50-70	70-90	90-110	110-130
Frequency	5	8	$f_1$	20	$f_2$	2

13. The mean of the following distribution is 18. Find the frequency  $f$  of the class 19 – 21. **CBSE2018-4M**

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

14. The following distribution gives the daily income of 50 workers of a factory :

Daily income (in Rs.)	100-120	120-140	140-160	160-180	180-200
No. of Workers	12	14	8	6	10

Convert the distribution above to a less than type cumulative frequency distribution and draw its ogive. **CBSE2018-4M**

15. The median of the following data is 52.5. If the total frequency is 100, find the values of  $x$  and  $y$ . **CBSE2018-4M**

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Freq	2	5	$x$	12	17	20	$y$	9	7	4

16. Find the mean and mode for the following data : **CBSE2018-4M**

Class	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Freq	4	8	10	12	10	4	2

17. If the mean of the following frequency distribution is 62.8. Find the missing frequencies  $f_1$  and  $f_2$ . Sum of all frequencies is 50. **CBSE2010-4M**

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

**CLASS X: PROBABILITY**  
**(PREVIOUS YEARS BOARD QUESTIONS)**

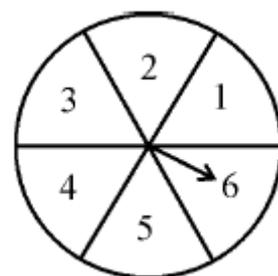
1. From a well shuffled pack of card a card is drawn at random. Find the probability of getting a black queen. **CBSE2008-1M**
2. Two coins are tossed simultaneously. Find the probability of getting exactly one head. **CBSE2009-1M**
3. From a well shuffled pack of card a card is drawn at random. Find the probability of getting a red face card. **CBSE2010-1M**
4. A die is thrown twice. What is the probability that the same number will come up either time? **CBSE2010-1M**
5. Which of the following can't be probability of an event? **CBSE2011-1M**  
(a) 1.5 (b)  $\frac{3}{5}$  (c) 25% (d) 0.3
6. Cards marked with numbers 2, 3, 4, 5, ....., 11 are placed in a box. One card is drawn at random from the box. Find the probability that number is a prime number. **CBSE2012-1M**
7. Two dice are thrown together. Find the probability of getting the same number on both the dice. **CBSE2012-1M**
8. Find the probability of getting an even number when a die is thrown once. **CBSE2013-1M**
9. A box contains 90 discs. A disc is drawn at random. Find the probability that it bears a prime number less than 23. **CBSE2013-1M**
10. If  $P(A)$  denotes the probability of an event  $A$ , then **CBSE2013-1M**  
(a)  $P(A) < 0$  (b)  $P(A) > 1$  (c)  $0 \leq P(A) \leq 1$  (d)  $-1 \leq P(A) \leq 1$
11. One ticket is selected at random from tickets numbered 1 to 40. Find the probability the selected ticket has a number which is a multiple of 7. **CBSE2013-1M**
12. If two dice are rolled together then find the probability of getting even number on both the dice. **CBSE2014-1M**
13. A number is selected at random from 1 to 30. Find the probability of getting a prime number. **CBSE2014-1M**
14. In a family of 3 children, find the probability of having at least one boy. **CBSE2014-1M**
15. A letter of English alphabet is chosen at random. Determine the probability that the chosen letter is consonant. **CBSE2015-1M**
16. Two different dice are tossed together. Find the probability that the product of the two numbers on the top of the dice is 6. **CBSE2015-1M**
17. A game of chance consists of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 and these are equally likely outcomes. Find the probability that the arrow will point at any factor of 8. **CBSE2015-1M**
18. Cards marked 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. **CBSE2016-1M**
19. A letter of English alphabet is chosen at random. Find the probability that the letter is from the word MATHEMATICS. **CBSE2016-1M**
20. 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. **CBSE2016-1M**
21. A card is drawn at random from a well shuffled pack of 52 cards. Find the probability of getting neither a red card nor a queen. **CBSE2016-1M**
22. 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? **CBSE2017-1M**
23. 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? **CBSE2017-1M**
24. If three different coins are tossed together, then find the probability of getting two heads. **CBSE2017-1M**

25. Cards marked with numbers 3, 4, 5, ....., 50 are placed in a box and mixed thoroughly. One card is drawn at random from the box. Find the probability that number on the drawn card is (i) Divisible by 7. (ii) A number which is a perfect square. **CBSE2007-2M**
26. A die is thrown once. Find the probability of getting (i) An even prime number (ii) A multiple of 3 **CBSE2008-2M**
27. A coin is tossed two times. Find the probability of getting at least one head. **CBSE2011-2M**
28. A card is drawn from a well shuffled 52 cards. Find the probability that the card is (a) a red king card (b) a queen or a jack **CBSE2012-2M**
29. A number is selected at random from first 50 natural numbers. Find the probability that it is a multiple of 3 and 4. **CBSE2012-2M**
30. A card is drawn from well shuffled 52 cards. Find the probability that the card drawn is neither a king nor a queen. **CBSE2013-2M**
31. A card is drawn from a well shuffled 52 cards. Find the probability that the card is (a) a red face card (b) a black king **CBSE2013-2M**
32. Rahim tosses a coin two times. Find the probability of getting at least one tail. **CBSE2014-2M**
33. Two different dice are tossed together. Find the probability **CBSE2014-2M**  
(i) that the number on each die is even. (ii) that the sum of numbers appearing on the two dice is 5.
34. Two different dice are thrown together. Find the probability that the product of the numbers appeared is less than 18. **CBSE2017-2M**
35. Two different dice are tossed together. Find the probability : **CBSE2018-2M**  
(i) of getting a doublet (ii) of getting a sum 10, of the numbers on the two dice.
36. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball from the bag is three times that of a red ball, find the number of blue balls in the bag. **CBSE2018-2M**
37. A bag contains 5 white balls, 7 red balls, 4 black balls and 2 blue balls. A ball is drawn at random from the bag. Find the probability that the drawn ball is (i) white or blue, (ii) neither white nor black. **CBSE2018-2M**
38. A number is selected at random from the first 50 natural numbers. Find the probability that it is a multiple of 3 and 4. **CBSE2018-2M**
39. A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of getting (i) a red king (ii) a queen or a jack. **CBSE2018-2M**
40. 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. **CBSE2018-2M**
41. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball from the bag is thrice that of a red ball, find the number of blue balls in the bag. **CBSE2007-3M**
42. The king, queen and jack of clubs are removed from a deck of 52 playing cards and the remaining cards are shuffled. A card is drawn from the remaining cards. Find the probability of getting a card of (i) heart (ii) queen (iii) clubs. **CBSE2009-3M**
43. Two dice are thrown simultaneously. What is the probability that **CBSE2009-3M**  
(i) 5 will not come up on either of them? (ii) 5 will come up on at least one?  
(iii) 5 will come up at both dice?
44. Card numbered 1, 2, .....35 are kept in a bag. A card is drawn at random from the bag. Find the probability that the card being picked is **CBSE2010-3M**  
(i) Prime number less than 15 (ii) A number divisible by 3 and 5.
45. From a well-shuffled pack of playing cards, black jacks, black kings and black aces are removed. A card is drawn at random from the pack. Find the probability of getting  
(i) a red card, (ii) not a diamond card. **CBSE2010-3M**
46. Two dice are rolled once. Find the probability of getting such numbers on two dice, whose product is a perfect square. **CBSE2011-3M**

47. A game consists of tossing a one rupee coin 3 times and noting its outcome each time. Hanif wins if all the tosses give the same result i.e., three heads or three tails, and loses otherwise. Calculate the probability that Hanif will lose the game. **CBSE2011-3M**
48. All kings, queens and aces are removed from a pack of 52 cards. The remaining cards well shuffled and a card is drawn. Find the probability that the drawn card is (a) a black face card (b) a red card. **CBSE2012-3M**
49. A box contains 100 red cards, 200 yellow and 50 blue cards. A card is drawn at random. Find the probability that it will be (a) a blue card (b) not a yellow card (c) neither yellow nor a blue card. **CBSE2012-3M**
50. Two different dice are rolled together. Find the probability of getting (i) the sum of numbers on two dice be 5 (ii) even numbers on both the dice **CBSE2015-3M**
51. A bag contains 18 balls out of which x balls are red. **CBSE2015-3M**  
 (i) If one ball is drawn at random from the bag, what is the probability that it is not red?  
 (ii) If 2 more red balls are put in the bag, the probability of drawing a red ball will be times the probability of drawing a red ball in the first case. Find the value of x.
52. The probability of selecting a red ball at random from a jar that contains only red, blue and orange balls is 0.25. The probability of selecting a blue ball at random from the same jar is  $\frac{1}{3}$ . If the jar contains 10 orange balls, find the total number of balls in the jar. **CBSE2015-3M**
53. In a single throw of a pair of different dice, what is the probability of getting (i) a prime number on each dice ? (ii) a total of 9 or 11 ? **CBSE2016-3M**
54. Two dice of different colours are thrown at the same time. Write down all the possible outcomes. Find the probability that the sum of numbers appearing on both the dice is a multiple of 5. **CBSE2016-3M**
55. A game consist of tossing a one-rupee coin 3 times and noting the outcome each time. Ramesh will win the game if all the tosses show the same result, (i.e. either all three heads or all three tails) and loses the game otherwise. Find the probability that Ramesh will lose the game. **CBSE2016-3M**
56. Two different coins are tossed together. Find the probability of getting (i) exactly two heads (ii) at least two heads (iii) at least two tails. **CBSE2016-3M**
57. A bag contains 15 white and some black balls. If the probability of drawing a black ball from the bag is thrice that of drawing a white ball, find the number of black balls in the bag. **CBSE2017-3M**
58. 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. **CBSE2017-3M**
59. A lot consists of 144 ball pens of which 20 are defective. The customer will buy a ball pen if it is good, but will not buy a defective ball pen. The shopkeeper draws one pen at random from the lot and gives it to the customer. What is the probability that  
 (i) customer will buy the ball pen (ii) customer will not buy the ball pen **CBSE2017-3M**
60. A group consist of 12 persons, of whom 3 are extremely patient, other 6 are extremely honest and the rest are extremely kind. A person from the group is selected at random. Assuming that each person is equally likely to be selected, find the probability of selecting a person who is (a) extremely patient, (b) extremely kind or honest. Which of the above values you prefer more? **CBSE2013-4M**
61. A piggy bank contains hundred 50p coins, seventy Rs 1 coins, fifty Rs 2 coins and thirty Rs 5 coins. If it is equally likely that one of the coins will fall out when the bank is turned upside down, what is the probability that the coin **CBSE2013-4M** (a) Will be a Rs. 1 coin? (b) Will not be a Rs. 5 coin? (c) Will be a Rs. 50 p or Rs.2 coin?
62. A bag contains cards numbered from 1 to 49. A card is drawn at random from the bag. Find the probability that the drawn card is (a) an odd number (b) a multiple of 5 (c) a

perfect square (d) an even prime number **CBSE2014-4M**

63. All the red face cards 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) of red colour (ii) a queen (iii) an ace (iv) a face card **CBSE2014-4M**
64. A bag contains 20 cards numbered from 1 to 20. A card is drawn at random from the bag. Find the probability that the drawn card is (a) divisible by 2 or 3 (b) a prime number **CBSE2015-4M**
65. A box contains cards bearing numbers from 6 to 70. If one card is drawn at random from the box, find the probability that it bears **CBSE2015-4M**  
(i) a one digit number. (ii) a number divisible by 5.  
(iii) an odd number less than 30. (iv) a composite number between 50 and 70.
66. A card is drawn at random from a well-shuffled deck of playing cards. Find the probability that the card drawn is **CBSE2015-4M**  
(i) a card of spade or an ace. (ii) a black king.  
(iii) neither a jack nor a king. (iv) either a king or a queen.
67. A game of chance consists of spinning an arrow on a circular board, divided into 8 equal parts, which comes to rest pointing at one of the numbers 1, 2, 3, ..., 8, which are equally likely outcomes. What is the probability that the arrow will point at (i) an odd number (ii) a number greater than 3 (iii) a number less than 9. **CBSE2016-4M**
68. The king, Queen and Jack of clubs are removed from a deck of 52 playing cards and remaining cards then well shuffled. Now a card is drawn at random from the remaining cards. Find the probability that the drawn card is : (i) a card of hearts (ii) a red jack (iii) a black card. **CBSE2016-4M**
69. In fig. is shown a disc on which a player spins an arrow twice. The fraction  $\frac{a}{b}$  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  $\frac{a}{b} > 1$ . **CBSE2016-4M**



76. 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 **CBSE2018-4M**
- (i) of spade
  - (ii) of black king
  - (iii) of club
  - (iv) of jacks