

CBSE Class 10 Maths Question Bank

Q1) 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° and from the same point angle of elevation of the top of the pedestal is 45° . Find the height of the pedestal. (use $\sqrt{3} = 1.73$)

Q2) Prove that :

$$\left(\frac{\sin A}{1 - \cos A} - \frac{1 - \cos A}{\sin A} \right) \cdot \left(\frac{\cos A}{1 - \sin A} - \frac{1 - \sin A}{\cos A} \right)$$

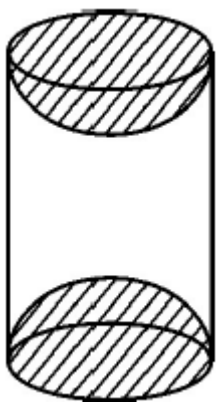
Q3) A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball from the bag is three times that of a red ball, find the number of blue balls in the bag.

Q4) Find the value of y for which the distance between the points $(2, -3)$ and $(10, y)$ is 10 units.

Q5) Given $\triangle ABC \sim \triangle PQR$, if $\frac{AB}{PQ} = \frac{1}{3}$, then find $\frac{\text{ar } \triangle ABC}{\text{ar } \triangle PQR}$.

Q6) Find HCF and LCM of 404 and 96 and verify that $\text{HCF} \times \text{LCM} = \text{Product of the two given numbers}$.

Q7) 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.



Q8) 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?

Q9) The mean of the following distribution is 18. Find the frequency f of the class 19-21.

Class	11-13	13-15	15-17	17-19	19-21	21-23	23-25
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Frequency	3	6	9	13	f	5	4
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Q10) 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.

Q11) Prove that $\sqrt{3}$ is an irrational number.

Q12) A field is in the form of a rectangle of length 20 m and width 14 m. A 10 m deep well of diameter 7 m is dug in one corner of the field and the earth taken out of the well is spread evenly over the remaining part of the field. Find the rise in the level of the field. (Use $\pi = \frac{22}{7}$)

Q13) As observed from the top of a 75 m high lighthouse from the sea-level, the angles of depression of two ships are 30° and 45° . If one ship is exactly behind the other, on the same side of the lighthouse, find the distance between two ships.

Q14) Two water taps together can fill a tank in 6 hours. The tap of larger diameter takes 9 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

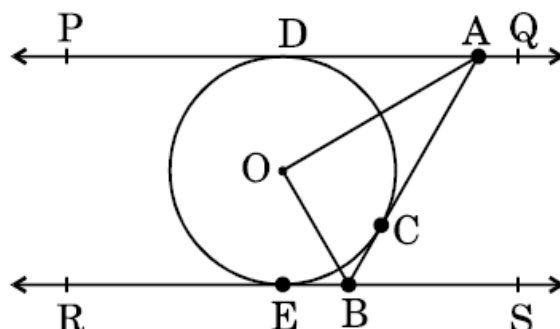
Q15) Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.

Q16) In a flower bed, there are 23 rose plants in the first row, 21 in the second, 19 in the third, and so on. If there are 5 rose plants in the last row, how many rows are there in the flower-bed?

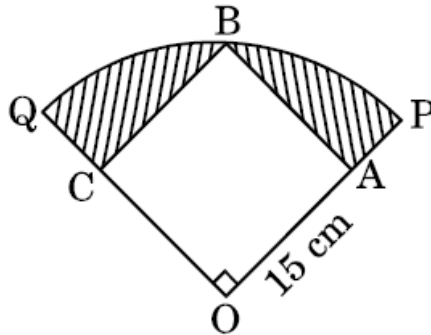
Q17) The probability of selecting a blue marble at random from a jar that contains only blue, black and green marbles is $\frac{1}{5}$. The probability of selecting a black marble at random from the same jar is $\frac{1}{4}$. If the jar contains 11 green marbles, find the total number of marbles in the jar.

Q18) Using Euclid's Algorithm, find the HCF of 2048 and 960.

Q19) In Figure, PQ and RS are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting PQ at A and RS at B. Prove that $\angle AOB = 90^\circ$.



Q20) In Figure, a square OABC is inscribed in a quadrant OPBQ. If OA = 15 cm, find the area of the shaded region. (Use $\pi = 3.14$)



Q21) Which term of the Arithmetic Progression $-7, -12, -17, -22, \dots$ will be -82 ? Is -100 any term of the A.P.? Give reason for your answer.

Q22) Change the following distribution to a 'more than type' distribution. Hence draw the 'more than type' ogive for this distribution.

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

Q23) Construct a triangle ABC with side $BC = 6$ cm, $AB = 5$ cm and $\angle ABC = 60^\circ$. Then construct another triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the triangle ABC.

Q24) A pole has to be erected at a point on the boundary of a circular park of diameter 13 m in such a way that the difference of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 m. Is it possible to do so? If yes, at what distances from the two gates should the pole be erected?

Q25) 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?

Q26) If $\tan(A + B) = 1$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$, $0^\circ < A + B < 90^\circ$, $A > B$, then find the values of A and B.

Q27) Check whether $g(x)$ is a factor of $p(x)$ by dividing polynomial $p(x)$ by polynomial $g(x)$, where $p(x) = x^5 - 4x^3 + x^2 + 3x + 1$, $g(x) = x^3 - 3x + 1$

Q28) Solve the following pair of linear equations:

$$\begin{aligned} 3x - 5y &= 4 \\ 2y + 7 &= 9x \end{aligned}$$

Q29) Express 429 as a product of its prime factors.

Q30) Evaluate:

$$\frac{\tan 65}{\cot 25}$$

Q31) Find a rational number between 2 and 7.

Q32) How many multiples of 4 lie between 10 and 205?

Q33) Prove that $2 + 3\sqrt{3}$ is an irrational number when it is given that $\sqrt{3}$ is an irrational number.

Q34) If $\sec \theta + \tan \theta = m$, show that

$$\frac{m^2 - 1}{m^2 + 1} = \sin \theta$$

Q35) Find the value of x, when in the A.P. given below

$$2 + 6 + 10 + \dots + x = 1800.$$

Q36) A container opened at the top and made up of a metal sheet, is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends as 8 cm and 20 cm respectively. Find the cost of milk which can completely fill the container, at the rate of ₹50 per litre. Also find the cost of metal sheet used to make the container, if it costs ₹10 per 100 cm². (Take $\pi = 3.14$)

Q37) Find the value/s of k for which the quadratic equation $3x^2 + kx + 3 = 0$ has real and equal roots.

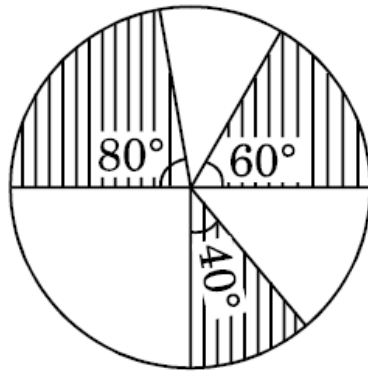
Q38) For what value of k, does the system of linear equations

$$2x + 3y = 7$$

$$(k - 1)x + (k + 2)y = 3k$$

have an infinite number of solutions?

Q39) In Figure, three sectors of a circle of radius 7 cm, making angles of 60°, 80° and 40° at the centre are shaded. Find the area of the shaded region.



Q40) For what value of p , are the points $(2, 1)$, $(p, -1)$ and $(-1, 3)$ collinear?

Q41) In two concentric circles, prove that all chords of the outer circle which touch the inner circle, are of equal length.

Q42) The angle of elevation of an aeroplane from a point A on the ground is 60° . After a flight of 30 seconds, the angle of elevation changes to 30° . If the plane is flying at a constant height of $3600\sqrt{3}$ metres, find the speed of the aeroplane.

Q43) A train travels 360 km at a uniform speed. If the speed had been 5 km/hr more, it would have taken 1 hr less for the same journey. Find the speed of the train.

Q44) Use Euclid's division lemma to show that the square of any positive integer is either of the form $3m$ or $3m + 1$ for some integer m .

Q45) Given that $\text{HCF}(306, 657) = 9$, find $\text{LCM}(306, 657)$.

Q46) Find a quadratic polynomial, the sum and product of whose zeroes are -3 and 2 , respectively.

Q47) Find all the zeroes of $2x^4 - 3x^3 - 3x^2 + 6x - 2$, if you know that two of its zeroes are 2 and -2 .

Q48) 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 $g(x)$.

Q49) Two rails are represented by the equations $x + 2y - 4 = 0$ and $2x + 4y - 12 = 0$. Represent this situation geometrically.

Q50) The cost of 2 kg of apples and 1 kg of grapes on a day was found to be ₹160. After a month, the cost of 4 kg of apples and 2 kg of grapes is ₹300. Represent the situation algebraically and geometrically.

Q51) Graphically, find whether the following pair of equations has no solution, unique solution or infinitely many solutions:

$$5x - 8y + 1 = 0$$

$$3x - \frac{24}{5}y + \frac{3}{5} = 0$$

Q52) Half the perimeter of a rectangular garden, whose length is 4 m more than its width, is 36 m. Find the dimensions of the garden.

Q53) Five years hence, the age of Jacob will be three times that of his son. Five years ago, Jacob's age was seven times that of his son. What are their present ages?

Q54) The sum of a two-digit number and the number obtained by reversing the digits is 66. If the digits of the number differ by 2, find the number. How many such numbers are there?

Q55) Yash scored 40 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks been deducted for each incorrect answer, then Yash would have scored 50 marks. How many questions were there in the test?

Q56) Roohi travels 300 km to her home partly by train and partly by bus. She takes 4 hours if she travels 60 km by train and the remaining by bus. If she travels 100 km by train and the remaining by bus, she takes 10 minutes longer. Find the speed of the train and the bus separately.

Q57) A train covered a certain distance at a uniform speed. If the train would have been 10 km/h faster, it would have taken 2 hours less than the scheduled time. And, if the train were slower by 10 km/h; it would have taken 3 hours more than the scheduled time. Find the distance covered by the train.

Q58) Find two consecutive positive integers, sum of whose squares is 365.

Q59) A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

Q60) Sum of the areas of two squares is 468 m². If the difference of their perimeters is 24 m, find the sides of the two squares.

Q61) Find the discriminant of the equation $3x^2 - 2x + \frac{1}{3} = 0$ and hence find the nature of its roots. Find them, if they are real.

Q62) The amount of money in the account every year, when ₹10000 is deposited at compound interest at 8 % per annum.

Q63) Determine the AP whose 3rd term is 5 and the 7th term is 9.

Q64) For what value of n, are the nth terms of two APs: 63, 65, 67, . . . and 3, 10, 17, . . . equal?

Q65) Subba Rao started work in 1995 at an annual salary of ₹5000 and received an increment of ₹200 each year. In which year did his income reach ₹7000?

Q66) If the sum of the first n terms of an AP is $4n - n^2$, what is the first term? What is the sum of first two terms? What is the second term? Similarly, find the 3rd, the 10th and the n th terms.

Q67) ABCD is a trapezium in which $AB \parallel DC$ and its diagonals intersect each other at the point O. Show that

$$\frac{AO}{BO} = \frac{CO}{DO}$$

Q68) D is a point on the side BC of a triangle ABC such that $\angle ADC = \angle BAC$. Show that $CA^2 = CB \times CD$.

Q69) D, E and F are respectively the mid-points of sides AB, BC and CA of $\triangle ABC$. Find the ratio of the areas of $\triangle DEF$ and $\triangle ABC$.

Q70) ABC is an isosceles triangle right angled at C. Prove that $AB^2 = 2AC^2$

Q71) Prove that:

$$\sqrt{\frac{1+\sin A}{1-\sin A}} = \sec A + \tan A$$

Q72) The shadow of a tower standing on a level ground is found to be 40 m longer when the Sun's altitude is 30° than when it is 60° . Find the height of the tower.

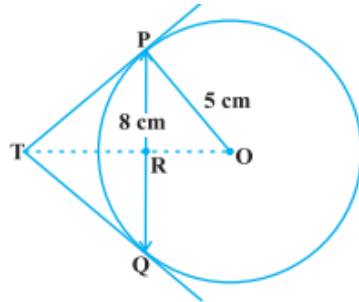
Q73) A kite is flying at a height of 60 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60° . Find the length of the string, assuming that there is no slack in the string.

Q74) As observed from the top of a 75 m high lighthouse from the sea-level, the angles of depression of two ships are 30° and 45° . If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships.

Q75) . The angles of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is 6 m.

Q76) How many tangents can a circle have?

Q77) PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T (see fig). Find the length TP.



Q78) Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

Q79) Prove that the parallelogram circumscribing a circle is a rhombus.

Q80) Draw a triangle ABC with side $BC = 7$ cm, $\angle B = 45^\circ$, $\angle A = 105^\circ$. Then, construct a triangle whose sides are $\frac{4}{3}$ times the corresponding sides of ΔABC .

Q81) Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60° .

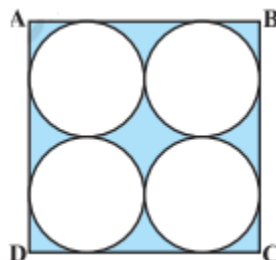
Q82) The cost of fencing a circular field at the rate of 24 per metre is ₹5280. The field is to be ploughed at the rate of ₹0.50 per m^2 . Find the cost of ploughing the field (Take $\pi = 22/7$).

Q83) The wheels of a car are of diameter 80 cm each. How many complete revolutions does each wheel make in 10 minutes when the car is travelling at a speed of 66 km per hour?

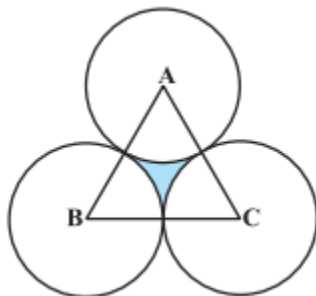
Q84) A chord of a circle of radius 12 cm subtends an angle of 120° at the centre. Find the area of the corresponding segment of the circle.

Q85) To warn ships for underwater rocks, a lighthouse spreads a red coloured light over a sector of angle 80° to a distance of 16.5 km. Find the area of the sea over which the ships are warned. (Use $\pi = 3.14$).

Q86) Find the area of the shaded region in Fig., where ABCD is a square of side 14 cm.



Q87) The area of an equilateral triangle ABC is 17320.5 cm^2 . With each vertex of the triangle as centre, a circle is drawn with radius equal to half the length of the side of the triangle (see Fig. 12.28). Find the area of the shaded region. (Use $\pi = 3.14$ and $3 = 1.73205$)



Q88) A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total surface area of the toy.

Q89) A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of the top is 2.8 m, find the area of the canvas used for making the tent. Also, find the cost of the canvas of the tent at the rate of ₹500 per m^2 .

Q90) A solid consisting of a right circular cone of height 120 cm and radius 60 cm standing on a hemisphere of radius 60 cm is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is 60 cm and its height is 180 cm.

Q91) The slant height of a frustum of a cone is 4 cm and the perimeters (circumference) of its circular ends are 18 cm and 6 cm. Find the curved surface area of the frustum.

Q92) A right triangle, whose sides are 3 cm and 4 cm (other than hypotenuse) is made to revolve about its hypotenuse. Find the volume and surface area of the double cone so formed.

Q93) The given distribution shows the number of runs scored by some top batsmen of the world in one-day international cricket matches.

Runs scored	Number of batsmen
3000 - 4000	4
4000 - 5000	18
5000 - 6000	9
6000 - 7000	7
7000 - 8000	6
8000 - 9000	3
9000 - 10000	1
10000 - 11000	1

Q94) A life insurance agent found the following data for distribution of ages of 100 policy holders. Calculate the median age, if policies are given only to persons having age 18 years onwards but less than 60 year.

Age (in years)	Number of Policy Holders
Below 20	2

Below 25	6
Below 30	24
Below 35	45
Below 40	78
Below 45	89
Below 50	92
Below 55	98
Below 60	100

Q95) The following table gives production yield per hectare of wheat of 100 farms of a village.

Production Yield (in kg/ha)	50-55	55-60	60-65	65-70	70-75	75-80
No. of farms	2	8	12	24	38	16

Q96) Two players, Sangeeta and Reshma, play a tennis match. It is known that the probability of Sangeeta winning the match is 0.62. What is the probability of Reshma winning the match?

Q97) 12 defective pens are accidentally mixed with 132 good ones. It is not possible to just look at a pen and tell whether or not it is defective. One pen is taken out at random from this lot. Determine the probability that the pen taken out is a good one.

Q98) A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball is double that of a red ball, determine the number of blue balls in the bag.

Q99) A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears

- (i) a two-digit number
- (ii) a perfect square number
- (iii) a number divisible by 5

Q100) A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be

- (i) red
- (ii) white
- (iii) not green