TOPPER LEARNING

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MOST IMPORTANT QUESTIONS

ICSE
Class X Maths
Most Important Questions (2018)

Chapters 1: Value Added Tax

1. A shopkeeper bought a washing machine at a discount of 20% from a wholesaler, the printed price of the washing machine being Rs. 18,000. The shopkeeper sells it to a consumer at a discount of 10% on the printed price. If the rate of sales tax is 8%, find:

   (i) the VAT paid by the shopkeeper

   (ii) the total amount that the consumer pays for the washing machine [4M]

2. The printed price of an article is Rs. 60,000. The wholesaler allows a discount of 20% to the shopkeeper. The shopkeeper sells the article to the customer at the printed price. Sales tax (under VAT) is charged at the rate of 6% at every stage. Find:

   (i) The cost to the shopkeeper inclusive of tax.

   (ii) VAT paid by the shopkeeper to the Government.

   (iii) The cost to the customer inclusive of tax. [3M]

Chapter2: Banking

1. Mr. Britto deposits a certain sum of money each month in a Recurring Deposit Account of a bank. It the rate of interest is of 8% per annum and Mr. Britto gets Rs. 8088 from the bank after 3 years, find the value of his monthly installment. [3M]
2. Shahrukh opened a 'Recurring Deposit' account in a bank and deposited Rs. 800 per month for 1 ½ years. If he received Rs. 15,084 at the time of maturity, find the rate of interest per annum. [3M]
3. Katrina opened a recurring deposit account with a Nationalized Bank for a period of 2 years. If the bank pays interest at the rate 6% per annum and the monthly installment is Rs. 1,000, find the: [3M]

   (i) Interest earned in 2 years

   (ii) Matured value

Chapter 3: Shares and Dividend

1. Rohit invested Rs. 9,600 on Rs. 100 shares at Rs. 20 premium paying 8% dividend. Rohit sold the shares when the price rose to Rs. 160. He invested the proceeds (excluding dividend) in 10% Rs. 50 shares at Rs. 40. Find the: [4M]

   (i) original number of shares

   (ii) sale proceeds

   (iii) new number of shares

   (iv) change in the two dividends.

2. Salman buys 50 shares of face value Rs. 100 available at Rs. 132. [4M]

   (i) What is his investment?

   (ii) If the dividend is 7.5%, what will be his annual income?

   (iii) If he wants to increase his annual income by Rs. 150, how many extra shares should he buy?

3. Mr. Parekh invested Rs. 52,000 on Rs. 100 shares at a discount of Rs. 20 paying 8% dividend. At the end of one year he sells the shares at a premium of Rs. 20. Find [4M]

   (i) The annual dividend

   (ii) The profit earned including his dividend.

Chapter 4: Linear Inequations

1. Solve the following inequation and represent the solution set on the number line: [3M]

   $2x - 5 \leq 5x + 4 < 11$, where $x \in I$

2. Solve the following inequation and represent the solution set on the number line: [3M]

   $$4x - 19 < \frac{3x}{5} - 2 \leq \frac{-2}{5} + x, x \in R$$

Chapter 5 and 6: Quadratic Equations

1. Without solving the following quadratic equation, find the value of 'p' for which the given equation has real and equal roots: $x^2 + (p - 3)x + p = 0$ [4M]
2. Solve for x using the quadratic formula. Write your answer corrected to two significant figures. [3M]

   $(x - 1)^2 - 3x + 4 = 0$
3. Solve the following equation: $x - \frac{18}{x} = 6$ [3M]

   Give your answer correct to two significant figures.
4. A two digit positive number is such that the product of its digits is 6. If 9 is added to the number, the digits interchange their places. Find the number. [4M]

Chapter 7: Ratio and Proportion

1. If $(x - 9) : (3x + 6)$ is the duplicate ratio of 4 : 9, find the value of x. [3M]
2. If a, b, c are in continued proportion, prove that $(a + b + c)(a - b + c) = a^2 + b^2 + c^2$. [3M]
3. Using componendo and dividendo, find the value of x [3M]

   $$\frac{\sqrt{3x+4} + \sqrt{3x-5}}{\sqrt{3x+4} - \sqrt{3x-5}} = 9$$
4. If $\frac{x^2+y^2}{x^2-y^2} = \frac{17}{8}$ then find the value of: [3M]

   (i) $x : y$ (ii) $\frac{x^3+y^3}{x^3-y^3}$
5. If $x = \frac{\sqrt{a+1} + \sqrt{a-1}}{\sqrt{a+1} - \sqrt{a-1}}$, using properties of proportion show that $x^2 - 2ax + 1 = 0$. [4M]
6. 6 is the mean proportion between two numbers x and y and 48 is the third proportional of x and y. Find the numbers. [3M]
7. What number must be added to each of the numbers 6, 15, 20 and 43 to make them proportional? [3M]

Chapter 8: Remainder and Factor Theorems

1. Find the value of 'k' if $(x - 2)$ is a factor of $x^3 + 2x^2 - kx + 10$. Hence determine whether $(x + 5)$ is also a factor. [3M]
2. Find 'a' of the two polynomials $ax^3 + 3x^2 - 9$ and $2x^3 + 4x + a$, leaves the same remainder when divided by $x + 3$. [3M]
3. Using the Remainder Theorem factorize completely the following polynomial. [4M]

   $3x^3 + 2x^2 - 19x + 6$

Chapter 9: Matrices

1. If $A = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 4 & -2 \\ -1 & 3 \end{bmatrix}$ and I is the identity matrix of the same order and A^t is the transpose of matrix A, find $A^t.B + BI$. [3M]
2. Let $A = \begin{bmatrix} 2 & 1 \\ 0 & -2 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 1 \\ -3 & -2 \end{bmatrix}$ and $C = \begin{bmatrix} -3 & 2 \\ -1 & 4 \end{bmatrix}$. Find $A^2 + AC - 5B$ [4M]
3. If $A = \begin{bmatrix} 3 & 5 \\ 4 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 \\ 4 \end{bmatrix}$, is the product AB possible? Give a reason. If yes, find AB.

   [3M]

Chapters 10: Arithmetic Progression

1. The sum of the 2^{nd} term and the 7^{th} term of an A.P. is 30. If its 15^{th} term is 1 less than twice of its 8^{th} term, find the A.P. [3M]
2. Find the sum of all natural numbers between 250 and 1000 which are divisible by 9.

   [3M]
3. Insert six A.M.s between 15 and –15. [4M]
4. Mrs. Gupta repays her total loan of Rs. 1,18,000 by paying instalments every month. If the instalment for the first month is Rs. 1,000 and it increases by Rs. 100 every month, what amount will she pay as the 30^{th} instalment of loan? What amount of loan she still has to pay after the 30^{th} instalment?

   [4M]

Chapter 11: Geometric Progression

1. Second term of a geometric progression is 6 and its fifth term is 9 times of its third term. Find the geometric progression. Consider that each term of the G.P. is positive. [3M]
2. If a, b, c and d are consecutive terms of a G.P., prove that $(a^2 + b^2)$, $(b^2 + c^2)$ and $(c^2 + d^2)$ are in G.P. [4M]
3. If a, b and c are in A.P., a, x, b are in G.P. whereas b, y and c are also in G.P. Show that x^2, b^2, y^2 are in A.P. [3M]
4. Find the sum of n terms of the series: 0.8 + 0.88 + 0.888 + ... [3M]
5. Find five geometric means between 1 and 27. [3M]

Chapters 12, 13 and 14: Co-ordinate Geometry

1. Three vertices of parallelogram ABCD taken in order are A(3, 6), B(5, 10) and C(3, 2)

   (i) the coordinate of the fourth vertex D

   (ii) length of diagonal BD

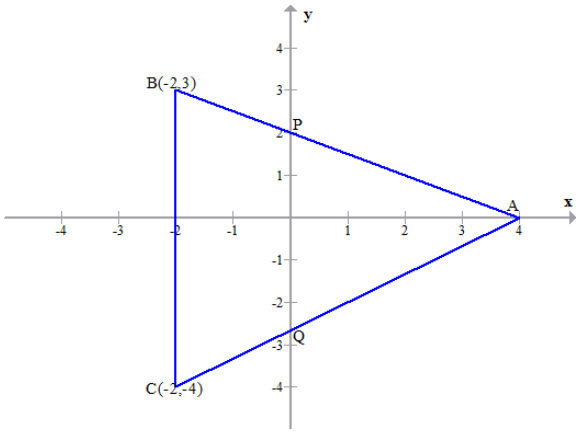
   (iii) equation of the side AD of the parallelogram ABCD [4M]
2. The value of 'a' for which of the following points A(a, 3), B(2, 1) and C(5, a) are collinear. Hence find the equation of the line. [3M]
3. In the given figure ABC is a triangle and BC is parallel to the y – axis. AB and AC intersect the y–axis at P and Q respectively. [4M]

   (i) Write the coordinates of A.

   (ii) Find the length of AB and AC.

   (iii) Find the ratio in which Q divides AC.

   (iv) Find the equation of the line AC



4. ABC is a triangle and G(4, 3) is the centroid of the triangle. If A = (1, 3), B = (4, b) and C = (a, 1), find 'a' and 'b'. Find length of side BC. [4M]

5. Using graph paper and taking 1 cm = 1 unit along both x-axis and y-axis. [4M]

   (i) Plot the points A(-4, 4) and N(2, 2).

   (ii) Reflect A and B in the origin to get the images A' and B' respectively.

   (iii) Write down the co-ordinates of A' and B'.

   (iv) Given the geometrical name for the figure ABA'B'.

   (v) Draw and name its lines of symmetry.

Chapter 15: Similarity

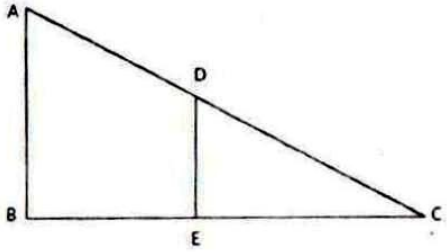
1. In the given figure, AB and DE are perpendicular to BC. [3M]

   (i) Prove that $\triangle ABC \sim \triangle DEC$

   (ii) If AB = 6 cm; DE = 4 cm and AC = 15 cm.

   Calculate CD.

   (iii) Find the ratio of area of $\triangle$ ABC: area of $\triangle$ DEC.

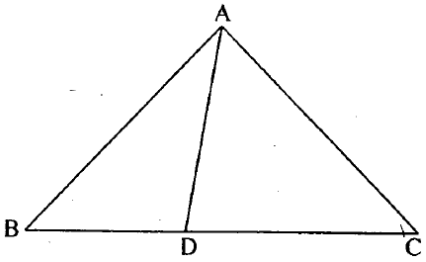


2. In ΔABC, $\angle ABC = \angle DAC$. AB = 8 cm, AC = 4 cm, AD = 5 cm. [4M]

   (i) Prove that ΔACD is similar to ΔBCA.

   (ii) Find BC and CD

   (iii) Find- area of Δ ACD : area of Δ ABC



3. ABC is a right angled triangle with $\angle ABC = 90°$. D is any point on AB and DE is perpendicular to AC. Prove that: [4M]

   (i) $\Delta ADE \sim \Delta ACB$

   (ii) If AC = 13 cm, BC = 5 cm and AE = 4 cm. Find DE and AD.

   (iii) Find. Area of ΔADE: area of quadrilateral BCED.

Chapter 16: Loci

1. Construct a triangle ABC, with AB = 7 cm, BC = 8 cm and ∠ABC = 60°. Locate by construction the point P such that: [4M]

   (i) P is equidistant from B and C.

   (ii) P is equidistant from AB and BC. Measure and record the length of PB.

2. A straight line AB is 8 cm long. Draw and describe the locus of a point which is: [4M]

   (i) Always 4 cm from the line AB

   (ii) Equidistant from A and B.

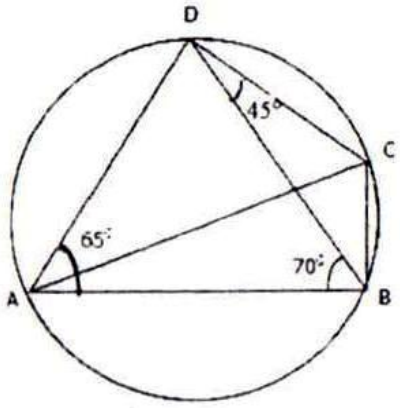
   Mark the two points X and Y, which are 4 cm from AB and equidistant from A and B. Describe the figure AXBY.

Chapters 17 and 18: Circles AND Tangents and Intersecting Chords

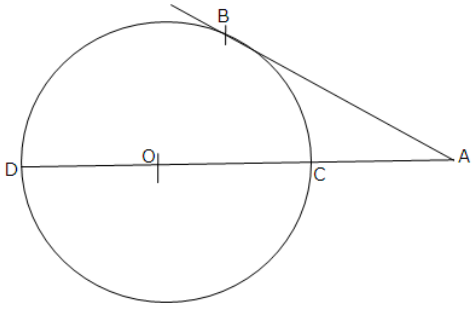
1. In the given figure, ∠BAD = 65°, ∠ABD = 70°, ∠BDC = 45° [3M]

   (i) Prove that AC is a diameter of the circle.

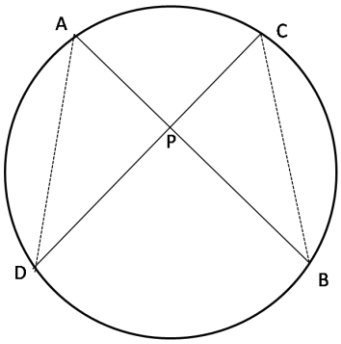
   (ii) Find ∠ACB



2. In the given figure O is the centre of the circle and AB is a tangent at B. If AB = 15 cm and AC = 7.5 cm. Calculate the radius of circle. [3M]



3. AB and CD are two chords of a circle intersecting at P. Prove that AP × PB = CP × PD [3M]

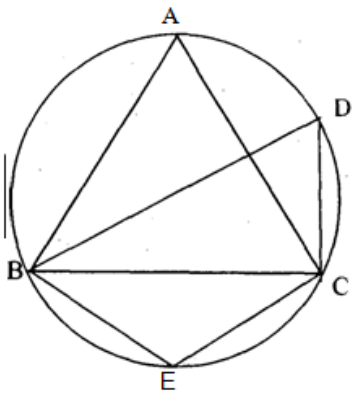


4. In the figure, m∠DBC = 58°. BD is the diameter of the circle. Calculate: [3M]

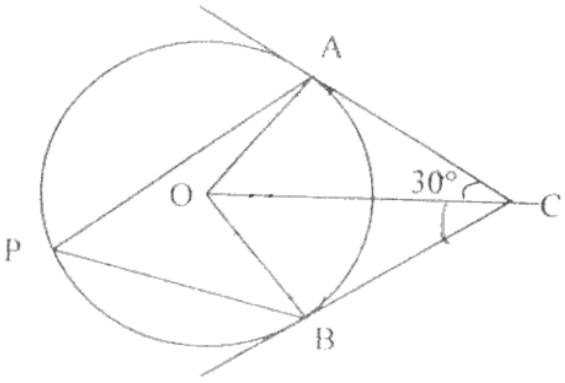
(i) m∠BDC

(ii) m∠BEC

(iii) m∠BAC



5. In the given figure O is the centre of the circle. Tangents A and B meet at C. If ∠ACO = 30°, find (i) ∠BCO (ii) ∠AOB (iii) ∠APB [4M]



Chapter 19: Constructions

1. Construct a ΔABC with BC = 6.5 cm, AB = 5.5 cm, AC = 5 cm. Construct the incircle of the triangle. Measure and record the radius of the incircle. [3M]
2. Draw a circle of radius 3.5 cm. Marks a point P outside the circle at a distance of 6 cm from the centre. Construct two tangents from P to the given circle. Measure and write down the length of one tangent. [3M]

Chapter 20: Mensuration

1. A metal cube of side 11 cm is completely submerged in water contained in a cylindrical vessel with diameter 28 cm. Find the rise in the level of water. [3M]
2. A solid cone of radius 5 cm and height 8 cm is melted and made into small spheres of radius 0.5 cm. Find the number of spheres formed. [3M]
3. A hollow sphere of internal and external radii 6 cm and 8 cm respectively is melted and recast into small cones of base radius 2 cm and height 8 cm. Find the number of cones. [3M]
4. The surface area of a solid metallic sphere is 2464 cm^2. It is melted and recast into solid right circular cones of radius 3.5 cm and height 7 cm. Calculate: [4M]

   (i) the radius of the sphere.

   (ii) the number of cones recast. (Take $\pi = 22/17$)

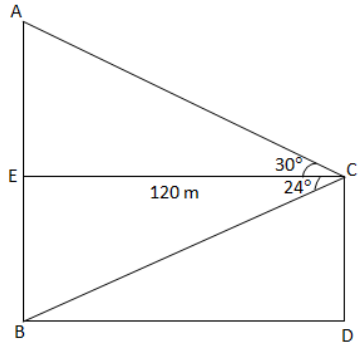
Chapters 21 and 22: Trigonometry

1. Prove the identity $(\sin\theta + \cos\theta)(\tan\theta + \cot\theta) = \sec\theta + \operatorname{cosec}\theta$ [3M]
2. Show that $\sqrt{\frac{1-\cos A}{1+\cos A}} = \frac{\sin A}{1+\cos A}$. [3M]
3. Evaluate without using trigonometric tables: [3M]

$$\cos^2 26^\circ + \cos 64^\circ \sin 26^\circ + \frac{\tan 36^\circ}{\cot 54^\circ}$$

4. An aeroplane at an altitude of 250 m observes the angle of depression of two boats on the opposite banks of a river to be 45° and 60° respectively. Find the width of the river. Write the answer corrected to the nearest whole number. [4M]

5. The horizontal distance between two towers is 120 m. The angle of elevation of the top and angle of depression of the bottom of the first tower as observed from the second tower is 30° and 24° respectively. [4M]



Find the height of the two towers. Give your answer correct to 3 significant figures.

6. A man observes the angle of elevation of the top of a building to be 30°. He walks towards it in a horizontal line through its base. On covering 60 m the angle of elevation changes to 60°. Find the height of the building correct to the nearest metre. [4M]

7. As observed from the top of a 80 m tall lighthouse, the angles of depression of two ships on the same side of the light house of horizontal line with its base are 30° and 40° respectively. Find the distance between the two ships. Give your answer correct to the nearest meter. [4M]

Chapters 23 and 24: Statistics

1. Marks obtained by 40 students in a short assessment is given below, where a and b are two missing data.

Marks	5	6	7	8	9
Number of Students	6	A	16	13	b

If the mean of the distribution is 7.2, find a and b. [4M]

2. Using step – deviation method, calculate the mean marks of the following distribution. State the modal class. [4M]

Class interval	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80	80 - 85	85 – 90
Frequency	5	20	10	10	9	6	12	8

3. The daily pocket expenses of 200 students in a school are given below: [4M]

Pocket expenses (in Rs.)	Number of students (Frequency)
0-5	10
5-10	14
10-15	28
15-20	42
20-25	50
25-30	30
30-35	14
35-40	12

Draw a histogram representing the above distribution and estimate the mode from the graph.

4. The weight of 50 workers is given below: [6M]

Weight in Kg	50-60	60-70	70-80	80-90	90-100	100-110	110-120
No. of Workers	4	7	11	14	6	5	3

Draw an ogive of the given distribution using a graph sheet. Take 2 cm = 10 kg on one axis and 2 cm = 5 workers along the other axis. Use a graph to estimate the following:

(i) The upper and lower quartiles.

(ii) If weighing 95 kg and above is considered overweight, find the number of workers who are overweight.

5. The table shows the distribution of the scores obtained by 160 shooters in a shooting competition. Use a graph sheet and draw an ogive for the distribution. (Take 2 cm = 10 scores on the X-axis and 2 cm = 20 shooters on the Y-axis). [6M]

Scores	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No.of shooters	9	13	20	26	30	22	15	10	8	7

Use your graph to estimate the following:

(i) The median.

(ii) The interquartile range.

The number of shooters who obtained a score of more than 85%.

6. The marks obtained by 120 students in a test are given below: [6M]

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of students	5	9	16	22	26	18	11	6	4	3

Draw an ogive for the given distribution on a graph sheet. Use suitable scale for ogive to estimate the following:

(i) The median.

(ii) The number of students who obtained more than 75% marks in the test.

(iii) The number of students who did not pass the test if minimum marks required to pass is 40.

Chapter 25: Probability

1. A box contains some black balls and 30 white balls. If the probability of drawing a black ball is two-fifths of a white ball, find the number of black balls in the box. [3M]
2. A bag contains 5 white balls, 6 red balls and 9 green balls. A ball is drawn at random from the bag. Find the probability that the ball drawn is: [3M]

   (i) a green ball

   (ii) a white or a red ball

   (iii) is neither a green ball nor a white ball.
3. From a pack of 52 playing cards all cards whose numbers are multiples of 3 are removed. A card is now drawn at random. [3M]

   (i) a face card (King, Jack or Queen)

   (ii) an even numbered red card