

## MOST IMPORTANT QUESTIONS (PART – 02 )

(STANDARD MATHS )

**X CBSE BOARD 2024- 25**

### Ch – 1 REAL NUMBERS

- Q1.** What is the least number that is divisible by all the numbers from 1 to 10.
- Q2.** If  $\text{HCF}(6, a) = 2$  and  $\text{LCM}(6, a) = 60$ , then find  $a^2 + 3a$ .
- Q3.** Find the greatest number of 5 digits exactly divisible by 12, 15 and 36
- Q4.** Find the smallest number which leaves remainder 8 and 12 when divided by 28 and 32 respectively.
- Q5.** Floor of a room is to be fitted with square marble tiles of the largest possible size. The size of the floor is  $10 \text{ m} \times 7 \text{ m}$ . What should be the size of tiles required that has to be cut and how many such tiles are required?
- Q6.** Find HCF of 378, 180 and 420 by prime factorization method. Is  $\text{HCF} \times \text{LCM}$  of three numbers is equal to the product of three numbers? Verify.
- Q7.** Find the HCF and LCM of 108, 120 and 252 using prime factorization method.
- Q8.** Find the largest number which divides 245 and 1037, leaving remainder 5 in each case.
- Q9.** Find the least number which divides by 35, 56 and 91 leaves the same remainder 7 in each case.
- Q10.** Find the smallest number which when divided by 28 and 32 leaves remainders 8 and 12 respectively.
- Q11.** The sum of LCM and HCF of two numbers is 7380. If the LCM of these numbers is 7340 more than their HCF. Find the product of the numbers.
- Q12.** Prove that  $\sqrt{5}$  is irrational.
- Q13.** Prove that  $(\sqrt{2} + \sqrt{3})$  is irrational.
- Q14.** Three measuring rods are 64 cm, 80 cm and 96 cm in length. Find the least length of cloth that can be measured an exact number of times, using any of the rods.
- Q15.** Prove that  $(4 - 5\sqrt{2})$  is an irrational number.

### CH -2 POLYNOMIALS

- Q1.** If one zero of the polynomial  $5z^2 + 13z - p$  is reciprocal of the other, then find  $p$ .
- Q2.** If  $\alpha$  and  $\beta$  are the zeroes of the polynomial  $3x^2 - 5x - 2$ , then evaluate  
(i)  $\alpha^2 + \beta^2$                       (ii)  $\alpha^3 + \beta^3$
- Q3.** If  $\alpha$  and  $\beta$  are the zeroes of the polynomial  $3x^2 - 5x - 2$  then find the polynomial whose zeroes are  $\frac{1}{\alpha}$  and  $\frac{1}{\beta}$ .
- Q4.** If one zero of the quadratic polynomial  $f(x) = 4x^2 - 8kx + 8x - 9$  is negative of the other then find the zeroes of  $kx^2 + 3kx + 2$ .

- Q5.** If the sum of the zeroes of the quadratic polynomial  $ky^2 + 2y - 3k$  is equal to twice their product, find the value of  $k$ .
- Q6.** If  $\alpha$  and  $\beta$  are the zeroes of the polynomial  $x^2 + 4x + 3$ , find the polynomial whose zeroes are  $1 + \frac{\beta}{\alpha}$  and  $1 + \frac{\alpha}{\beta}$ .
- Q7.** If  $m$  and  $n$  are the zeros of the polynomial  $3x^2 + 11x - 4$ , find the values of  $\frac{m}{n} + \frac{n}{m}$ .
- Q8.** If  $x + a$  is a factor of the polynomial  $x^2 + px + q$  and  $x^2 + mx + n$  prove that  $a = \frac{n-q}{m-p}$ .
- Q9.** If  $\alpha$  and  $\beta$  are zeroes of the polynomial  $f(x) = x^2 - p(x+1) - c$ , then find the value of  $(\alpha + 1)(\beta + 1)$ .
- Q10.** If zeroes of  $x^2 - kx + 6$  are in the ratio 3:2, find  $k$ .
- Q11.** If one zero of the quadratic polynomial  $(k^2 + k)x^2 + 68x + 6k$  is reciprocal of the other, find  $k$ .
- Q12.** If  $\alpha$  and  $\beta$  are the zeroes of the polynomial  $x^2 - 5x + m$  such that  $\alpha - \beta = 1$ , find  $m$ .
- Q13.** If the sum of squares of zeroes of the polynomial  $x^2 - 8x + k$  is 40, find the value of  $k$ .
- Q14.** If  $\alpha$  and  $\beta$  are the zeroes of the polynomial  $t^2 - t - 4$ , form a quadratic polynomial whose zeroes are  $\frac{1}{\alpha}$  and  $\frac{1}{\beta}$ .
- Q15.** Find the zeroes of the polynomial  $2s^2 + (1 + 2\sqrt{2})s + \sqrt{2}$  by factorization method and verify the relationship between the zeroes and coefficient of the polynomial.

### CH – 3 PAIR OF LINEAR EQUATION IN TWO VARIABLES

- Q1.** Solve for  $x$  and  $y$   
 $(a-b)x + (a+b)y = a^2 - 2ab - b^2$   
 $(a+b)(x+y) = a^2 + b^2$
- Q2.** Draw the graph of  $2x+y=6$  and  $2x-y+2=0$ . Shade the region bounded by these lines and  $x$  axis. Find the area of the shaded region.
- Q3.** Find the value of  $k$  for which the system of linear equations  $kx + ky = 12$ ,  $(k - 3)x + 3y = k$  will have infinite number of solutions.
- Q4.** In a  $\Delta ABC$ ,  $\angle C = 3\angle B = 2(\angle A + \angle B)$ . Find these angles.
- Q5.** In a cyclic quadrilateral  $ABCD$ ,  $\angle A = (2x + 4)^\circ$ ,  $\angle B = (y + 3)^\circ$ ,  $\angle C = (2y + 10)^\circ$  and  $\angle D = (4x - 5)^\circ$ . Find the four angles.
- Q6.** A number say  $z$  is exactly the four times the sum of its digits and twice the product of the digits. Find the numbers.
- Q7.** There are two points on a highway  $A$  and  $B$ . They are 70 km apart. An auto starts from  $A$  and another auto starts from  $B$  simultaneously. If they travel in the same direction, they meet in 7 hours, but if they travel towards each other they meet in 1 hour. Find how fast the two autos are.
- Q8.** The larger of two supplementary angles exceeds thrice the smaller by 20 degrees. Find them.
- Q9. Q10.** The ratio of incomes of two person  $A$  and  $B$  is 3 : 4 and the ratio of their expenditures is 5 : 7. If their savings are Rs 15,000 annually find their annual incomes.

**Q11.** Solve :

$$\frac{x}{a} + \frac{y}{b} = a + b \quad ; \quad \frac{x}{a^2} + \frac{y}{b^2} = 2$$

**Q12.** For what values of a and b the following pair of linear equations have infinite number of solutions ?

$$2x + 3y = 7$$

$$a(x + y) - b(x - y) = 3a + b - 2$$

**Q13.** Find the value of k for no solutions

$$(3k + 1)x + 3y - 2 = 0$$

$$(k^2 + 1)x + (k - 2)y - 5 = 0$$

**Q14.** Solve the pair of linear equations

$$152x - 378y = -74$$

$$-378x + 152y = -604$$

**Q15.** Pinky 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 were deducted for each wrong answer, then Pinky again would have scored 40 marks. How many questions were there in the test?

## CH - 4 QUADRATIC EQUATION

**Q1.** If  $\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$ , find x.

**Q2.** Determine the nature of the roots of the following quadratic equation :

(i)  $3a^2b^2x^2 - 16abcx + 4c^2 = 0$

(ii)  $4p^2q^2x^2 - 12pqx + 36 = 0$

**Q3.** Find the value of p for which the quadratic equation  $(2p + 1)x^2 - (7p + 2)x + (7p - 3) = 0$  has equal roots. Also find these roots.

**Q4.**  $\sqrt{2x - 3} + 1 = x$ , solve x.

**Q5.** If the roots of the equation  $(c^2 - ab)x^2 - 2(a^2 - bc)x + b^2 - ac = 0$  are equal, then prove that either  $a = 0$  or  $a^3 + b^3 + c^3 = 3abc$ .

**Q6.** In a flight of 3000 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 200 km/hour and the time of flight increased by 320 minutes. Find the duration of flight.

**Q7.** If the roots of the equation  $(b - c)x^2 + (c - a)x + (a - b) = 0$  are equal, then prove that  $2b = a + c$ .

**Q8.** 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/hr more. Find the original speed of the train.

**Q9.** Two water taps together can fill a tank in  $\frac{15}{4}$  hours. The larger takes 4 hours less than the smaller one to fill the tank separately. Formulate the quadratic equation and find the time in which each tap can separately fill the tank

**Q10.** What is the value of  $\sqrt{6 + \sqrt{6 + \sqrt{6 + \sqrt{6 + \dots}}}}$

**Q11.** Solve for x, if  $25x^{-2} - 10x^{-1} + 1 = 0$ ,  $x \neq 0$ .

**Q12.** A motor boat, whose speed is 18 km/hr 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.

**Q13.** If the quadratic equation  $(1+m^2)x^2+2mcx+(c^2-a^2)=0$ , Then prove that  $c^2 = a^2(1+m^2)$ .

**Q14.** In a quadratic equation  $ax^2+bx+c=0$ ,  $a \neq 0$ , one of its root is four times the other root then prove that  $4b^2 = 25ac$ .

**Q15.** One – fourth of a herd of camels was seen in the forest. Twice the square root of the herd had gone to mountains and the remaining 15 camels were seen on the bank of a river. Find the total number of camels.

### CH – 6 TRIANGLES

**Q1.** ABC is a triangle right-angled at C and 'p' is the length of the perpendicular from C to AB such that  $AB = c, CA = b, BC = a$ .

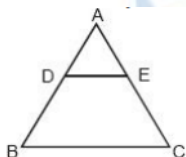
(i)  $pc = ab$

(ii)  $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$

**Q2.** The perimeter of two similar triangles ABC and LMN are 60 cm and 48 cm respectively. If  $LM = 8$  cm, then what is the length of AB?

**Q3.** If one diagonal of a trapezium divides the other diagonal in the ratio 1:3. Prove that one of the parallel sides is three times the other.

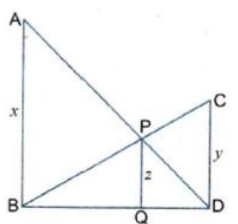
**Q4.** In the given figure, ABC is a triangle in which  $AB = AC$ , D and E are points on the sides AB and AC respectively, such that  $AD = AE$ . Show that the points B, C, E and D are concyclic.



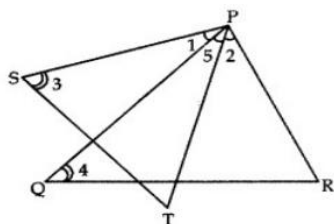
**Q5.** ABCD is a trapezium with  $AB \parallel DC$  in which diagonals AC and BD intersect at E and  $\Delta AED \sim \Delta BEC$ . Prove that  $AD = BC$ .

**Q6.** In  $\Delta ABC$ , A line XY parallel to BC cuts AB at X and AC at Y, if BY bisects  $\angle XYZ$ , show that  $BC=CY$ .

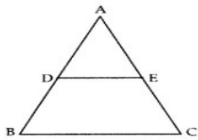
**Q7.** In fig .  $AB \parallel PQ \parallel CD$ ,  $AB = x$  units ,  $CD = y$  units and  $PQ = z$  units . Prove that  $\frac{1}{x} + \frac{1}{y} = \frac{1}{z}$ .



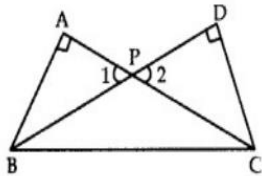
**Q8.** In fig.,  $\angle 1 = \angle 2$  and  $\angle 3 = \angle 4$ . Show that  $PT \cdot QR = PR \cdot ST$



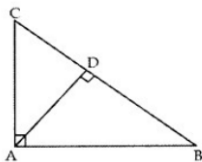
**Q9.** In  $\triangle ABC$ , D and E are the points on the sides AB and AC respectively such that  $DE \parallel BC$ . If  $AD = 6x - 7$ ,  $DB = 4x - 3$ ,  $AE = 3x - 3$ , and  $EC = 2x - 1$  then find. the value of 'x'.



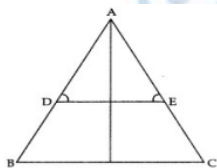
**Q10.** Two right triangles ABC and DBC are drawn on the same hypotenuse BC and on the same side of BC. If AC and BD intersect at P. Prove that  $AP \times PC = BP \times PD$ .



**Q11.** In fig.,  $\angle CAB = 90^\circ$  and  $AD \perp BC$ . If  $AC = 75$  cm,  $AB = 1$  m, and  $BD = 1.25$  m, find AD.



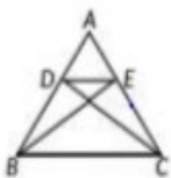
**Q12.** In the fig.,  $\angle D = \angle E$  and  $\frac{AD}{DB} = \frac{AE}{EC}$ . Prove that  $\triangle BAC$  is an isosceles triangle.



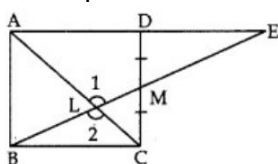
**Q13.** In the figure P is any point on side BC of  $\triangle ABC$ .  $PQ \parallel BA$  and  $PR \parallel CA$  are drawn. RQ is extended to meet BC produced at S. Prove that  $SP^2 = SB \times SC$ .



**Q14.** In the figure ,if  $\triangle BEA \cong \triangle CDA$ , then prove that  $\triangle DEA \sim \triangle BCA$ .



**Q15.** In figure, M is mid-point of side CD of a parallelogram ABCD. The line BM is drawn intersecting AC at L and AD produced at E. Prove that  $EL = 2BL$ .



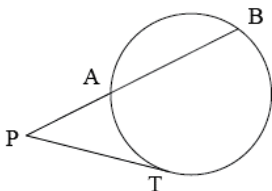


## CH – 7 COORDINATE GEOMETRY

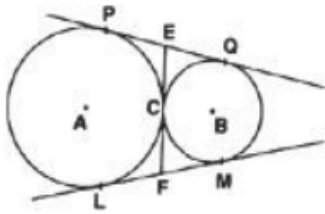
- Q1.** What is the value of  $a$  if the points  $(3,5)$  and  $(7,1)$  are equidistant from the point  $(a,0)$  ?
- Q2.** If the points  $A(4,3)$  and  $B(x,5)$  are on the circle with centre  $O(2,3)$  .Find the value of  $x$  .
- Q3.** Name the type of triangle formed by the point  $A(-5,6)$  , $B(-4,-2)$  and  $C(7,5)$  .
- Q4.** If the point  $C(a,b)$  is equidistant from the points  $A(x+y, y-x)$  and  $B(x-y, x+y)$  prove that  $ax = by$ .
- Q5.** Points  $A(-1,y)$  and  $B(5,7)$  lie on a circle with centre  $O(2,-3y)$  . Find the values of  $y$ . Hence find the radius of the circle.
- Q6.** The mid point  $P$  of the line segment joining the points  $A(-10,4)$  and  $B(-2,0)$  lies on the line segment joining the points  $C(-9,-4)$  and  $D(-4,y)$ . Find the ratio in which  $P$  divides  $CD$ . Also find the value of  $y$ .
- Q7.** Determine the ratio in which a line  $3x+y-9=0$ , divides the segment joining points  $(1,3)$  and  $(2,7)$ .
- Q8.** Find the ratio in which the segment joining the points  $(1,-3)$  and  $(4,5)$  is divided by  $x$  – axis .Also find the coordinates of the point on  $x$  – axis .
- Q9.** Find the ratio in which line  $x + 3y - 14 = 0$  divides the line segment joining  $A(-2,4)$  and  $B(1,7)$  .
- Q10.** If the coordinates of the mid points of the sides of a triangle are  $(3,1)$  ,(5,6) and  $(-3,2)$  .Find the coordinates of its vertices and centroid .
- Q11.** In a triangle  $PQR$  ,the coordinates of points  $P,Q$ , and  $R(3,2)$  ,  $(6,4)$  and  $(9,3)$  respectively .Find the coordinates of centroid  $G$ .
- Q12.** If co-ordinates of two adjacent vertices of a parallelogram are  $(3,2)$  and  $(1,0)$  and diagonals bisect each other at  $(-2,5)$  .Find the coordinates of the other vertices.
- Q13.** Find the vertices of the triangle, the midpoints of whose sides are  $(3,1)$  ,(5,6) and  $(-3,2)$ .
- Q14.** A point 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  $k$  .
- Q15.** If the midpoint of the line joining  $(3,4)$  and  $(k,7)$  is  $(x, y)$  and lying on the line  $2x + 2y + 1 = 0$ , find the value of  $k$ .

## CH - 10 CIRCLES

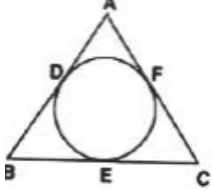
- Q1.** In the given figure  $PT$  is a tangent to the circle at  $T$ . If  $PA = 4$  cm and  $AB = 5$  cm, find  $PT$ .



- Q2.** In the following figure, two circles touch each other externally at  $C$ . Prove that the common tangent at  $C$  bisects the other two common tangents.

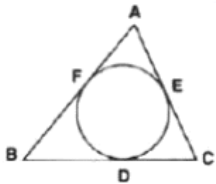


**Q3.** In the figure, if  $AB = AC$ , prove that  $BE = CE$ .

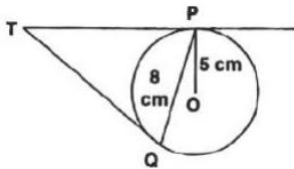


**Q4.** TP and TQ are the tangents from the external point T of a circle with centre O. If  $\angle OPQ = 30^\circ$ , then find the measure of  $\angle TQP$ .

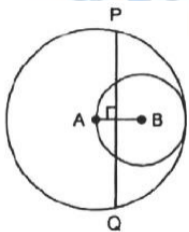
**Q5.** The incircle of triangle ABC touches the sides BC, CA and AB at D, E and F respectively. Show that  $AF + BD + CE = AE + BF + CD = \frac{1}{2}$  (perimeter of  $\triangle ABC$ )



**Q6.** 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. Find the length of TP.

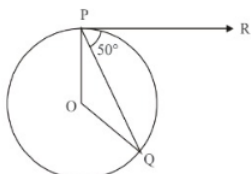


**Q7.** In the figure, two circles with centres A and B and radii 5 cm and 3 cm touching each other internally. If the perpendicular bisector of segment AB, meets the bigger circle at P and Q, find the length of PQ.



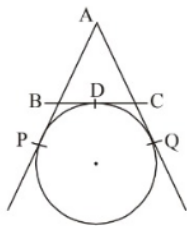
**Q8.** Two tangents making an angle of  $120^\circ$  with each other, are drawn to a circle of radius 6 cm. Show that the length of each tangent is  $2\sqrt{3}$  cm.

**Q9.** In fig., O is the centre of a circle, PQ is a chord and the tangent PR at P makes an angle of  $50^\circ$  with PQ. Find  $\angle POQ$ .

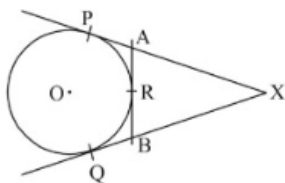


**Q10.** If two tangents inclined at an angle of  $60^\circ$  are drawn to a circle of radius 3 cm, and find the length of each tangent.

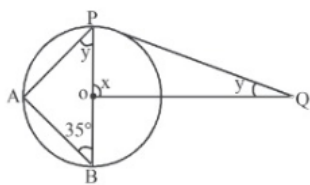
**Q11.** In the figure, find the perimeter of  $\triangle ABC$ , if  $AP = 12\text{cm}$ .



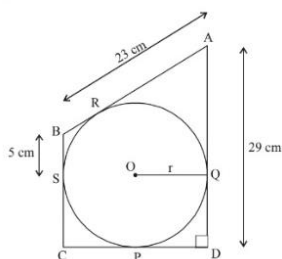
**Q12.** In the given figure,  $XP$  and  $XQ$  are tangents from  $X$  to the circle with centre  $O$ ,  $R$  is a point on the circle and  $AB$  is tangent at  $R$ . Prove that:  $XA + AR = XB + BR$ .



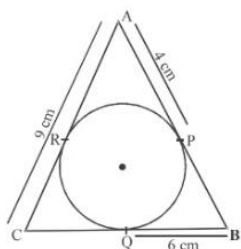
**Q13.** In the given figure,  $PQ$  is tangent and  $PB$  is diameter. Find the values of angles  $x$  and  $y$ .



**Q14.** In the given figure, find the radius of the circle.



**Q15.** In the given fig.  $AP = 4\text{ cm}$ ,  $BQ = 6\text{cm}$  and  $AC = 9\text{ cm}$ . Find the semi perimeter of  $\triangle ABC$ .



\_\_\_\_\_ **END** \_\_\_\_\_

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