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 HCF (6, a) = 2 and 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 m × 7 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 HCF X 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. Find the greatest number of four digits which exactly divisible by 15 ,24 and 36.

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 a 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 α and β are the zeroes of the polynomial $3x^2$ - 5x – 2 , then evaluate
(i) $\alpha^2 + \beta^2$ (ii) $\alpha^3 + \beta^3$

Q3. If α and β 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 one zero of the quadratic polynomial $4x^2 – 8kx + 8x -9$ is negative of the other , then find the zeroes of $kx^2 + 3kx +2$.

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 α and β 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 ration 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 α and β 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 α and β 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. If one zero pf the quadratic polynomial $4x^2 – 8kx + 8x – 9$ is the negative of the other ,then find the zeroes of $kx^2 + 3kx + 2$?

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 ΔABC , $\angle C = 3 \angle B = 2 (\angle A + \angle B)$. Find these angles.

Q5. . In a cyclic quadrilateral ABCD , $\angle A = (2x + 4)^0$, $\angle B = (y + 3)^0$, $\angle C = (2y + 10)^0$ and $\angle D =(4x - 5)^0$. 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.A and B are two points 150 km apart on a highway .Two cars start with different speeds from A and B at a same time .If they move in same direction ,they meet in 15 hours .If they move in opposite direction ,they meet in one hour .Find their speeds.

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 :

$\frac{x}{a}+\frac{y}{b}=a+b$

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

Q12. Foy r 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

- 378 x + 152 y = -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 $\sqrt{6+\sqrt{6+\sqrt{6+\sqrt{6+}}}}$..... .....

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 $4b^2 = 25\ ac$.

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

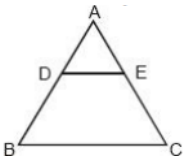
Q1. ABC is a triangle right-angled at C and 'p' is the length of the perpendicular from C to AB. By expressing the area of the triangle in the two ways, show that

(i)pc = ab (ii) $\frac{1}{p^2} + \frac{1}{a^2} + \frac{1}{a^2}$

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.

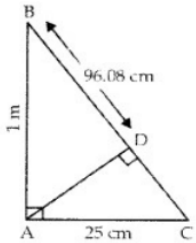
Q4. In the given figure, ABC is a triangle in which AB = AC, D and E are points on the sides AB and AC respectively, such that AD = AE. Show that the points B, C, E and D are concyclic.



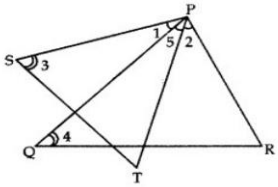
Q5. ABCD is a trapezium with AB II DC in which diagonals AC and BD intersect at E and ΔAED ~ΔBEC. Prove that AD = BC.

Q6.In ΔABC, A line XY parallel to BC cuts AB at X and AC at Y, if BY bisects ∠ XYZ, show that BC=CY.

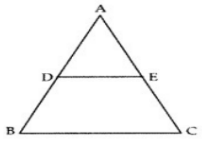
Q7. In the given figure, ∠CAB = 90° and AD ⊥ BC. If AC = 25 cm, AB = 1 m and BD = 96.08 cm, then find the value of AD.



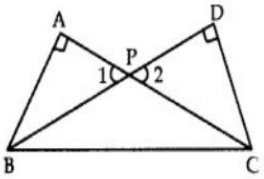
Q8. In fig., ∠1 = ∠2 and ∠3 = ∠4. Show that PT. QR = PR. ST



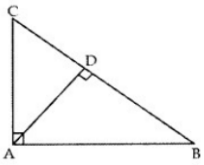
Q9. In ΔABC, D and E are the points on the sides AB and AC respectively such that DE || BC.
If AD = 6x – 7, DB = 4x – 3, AE = 3x – 3, and EC = 2x – 1 then find. the value of 'x'.



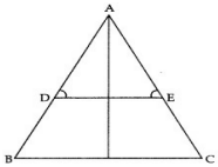
Q10. Two right triangles ABC and DBC are drawn on the same hypotenuse BC and on the same side of BC. If AC and BD intersect at P. Prove that AP × PC = BP × PD.



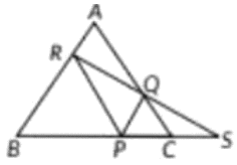
Q11. In fig., ∠CAB = 90° and AD ⊥ BC. If AC = 75 cm, AB = 1 m, and BD = 1.25 m, find AD.



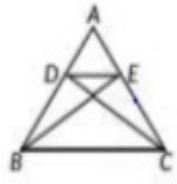
Q12. In the fig., ∠D = ∠E and $\frac{AD}{DB} = \frac{AE}{EC}$. Prove that ΔBAC is an isosceles triangle.



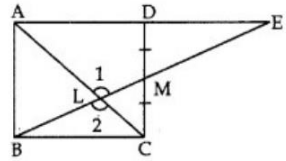
Q13. In the figure P is any point on side BC of ΔABC. PQ||BA and PR||CA are drawn is extended to meet BC produced at S. Prove that SP^2 = SB X SC.



Q14. In the figure ,if ΔBEA≅ΔCDA, then prove that ΔDEA~ΔBCA.



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 $ay = by$.

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.

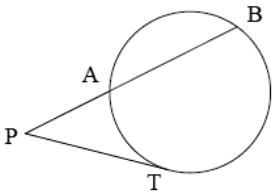
Q13. Find the vertices of the triangle, the midpoints of whose sides are (3,1),(5,6) and (-3,2).

Q14. If the points (x,0), (0,y) and (1,1) are collinear, show that $\frac{1}{x} + \frac{1}{y} = 1$.

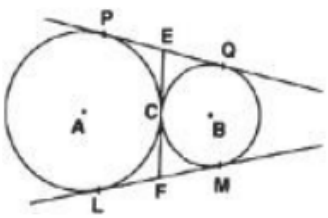
Q15. If the midpoint of the line joining (3,4) and (k,7) is (x, y) and lying on the line $2x + 2y+1=0$, find the value of k.

CH - 10 CIRCLES

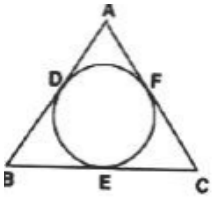
Q1. In the given figure PT is a tangent to the circle at T. If PA= 4 cm and AB=5 cm, find PT.



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

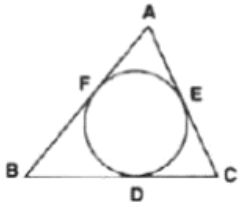


Q3. In the figure, if AB = AC, prove that BE = CE.

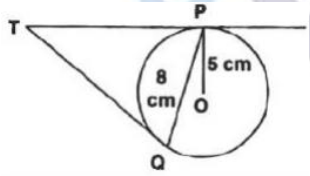


Q4. TP and TQ are the tangents from the external point T of a circle with centre O .If $\angle OPQ$ = 30^0 , then find the measure of $\angle TQP$.

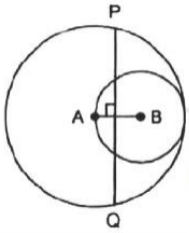
Q5. The in circle of triangle ABC touches the sides BC, CA and AB at D, E and F respectively
Show that AF+ BD + CD = AE + BF + CE = $\frac{1}{2}$ (perimeter of ΔABC)



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.

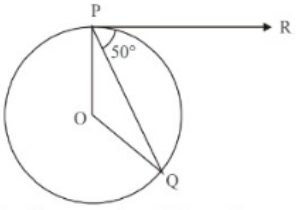


Q7. In the figure, two circles with centres A and B and radii 5 cm and 3 cm touching each other internally. If the perpendicular bisector of segment AB, meets the bigger circle at P and Q, find the length of PQ.



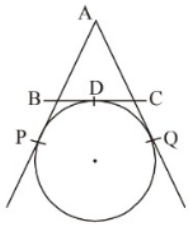
Q8. Two tangents making an angle of 120° with each other, are drawn to a circle of radius 6 cm. Show that the length of each tangent is $2\sqrt{3}$ cm.

Q9. In fig. , O is the centre of a circle ,PQ is a chord and the tangent PR at P makes an angles of 50^0 with PQ .Find $\angle POQ$.

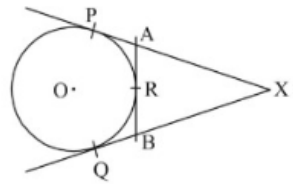


Q10. If two tangents inclined at an angle of 60^0 are drawn to a circle of radius 3 cm , and find the length of each tangent .

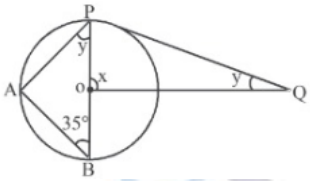
Q11. In the figure ,find the perimeter of ΔABC , if AP = 12cm.



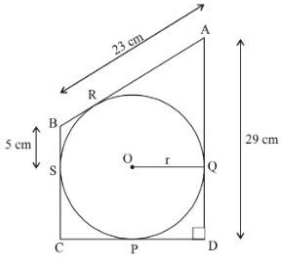
Q12. In the given figure ,XP and XQ are tangents from X to the circle with centre O ,R is a point on the circle and AB is tangent at R. Prove that : XA + AR = XB + BR .



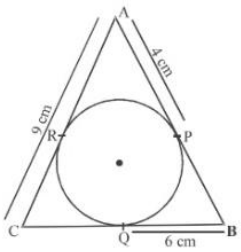
Q13. In the given figure ,PQ is tangent and PB is diameter .Find the values of angles x and y .



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



Q15. In the given fig. AP = 4 cm , BQ = 6cm and AC = 9 cm .Find the semi perimeter of ΔABC .



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