MATHS

BOOKS - X BOARD PREVIOUS YEAR PAPER ENGLISH

X Boards

Others

1. What is the common difference of an A P. in which $a_{21} - a_7 = 84$

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2. 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 ?

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3. 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 ?

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4. Find the value of p, for which one root of the quadratic equation $px^2 - 14x + 8 = 0$ is 6 times the other.

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5. Which term of the sequence $20, 19\frac{1}{4}, 18\frac{1}{2}, 17\frac{3}{4}, \cdot$ is the first negative term?

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6. Prove that the tangents drawn at the ends of a chord of a circle make equal angles with the chord.

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7. If $\left(a^2+b^2\right)x^2+2(ac+bd)x+c^2+d^2=0$ has no real root

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8. In an A.P. first term is 5, last term is 45 and sum = 400 . Find the no. of terms and common difference of A.P.

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9. 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.

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10. A bag contains 6 red balls and some blue balls. If the probability of drawing a blue ball from the bag is twice that of a red ball, find the number of blue balls in the bag.

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11. 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.

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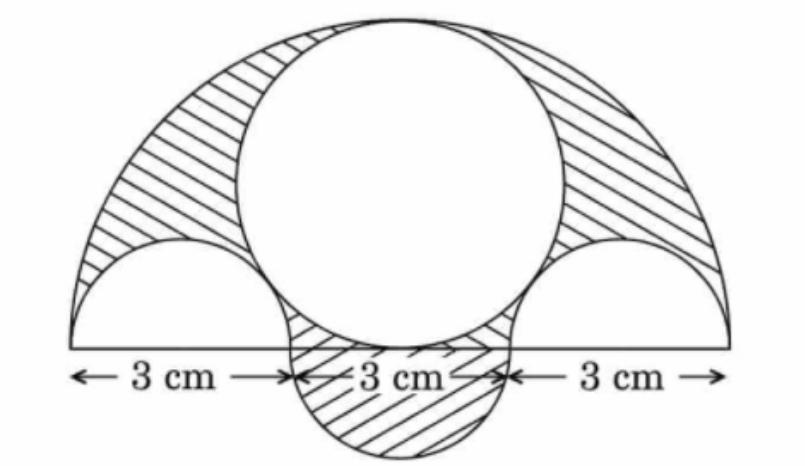
12. Three semicircles each of diameter 3 cm, a circle of diameter 4·5 cm and a semicircle of radius 4·5 cm are drawn in the given figure. Find the

area of the shaded region.



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13. Water in a canal, 2·4 m wide and 1·8 m deep, is flowing with a speed of 50 km/hour. How much area can it irrigate in 40 minutes, if 10 cm of standing water is required for irrigation ?

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14. 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.

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15. Solve for x : $\frac{1}{x+1}+\frac{3}{5x+1}=\frac{5}{x+4}, x \neq -1, -\frac{1}{5}, -4$

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16. Two taps running together can fill a tank in $3\left(\frac{1}{13}\right)$ 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 ?

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17. If the ratio of the sum of first n terms of two AP's is (7n+1) : (4n + 27), then find the ratio of their mth terms.

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18. about to only mathematics

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19. XY and $X'Y'$ are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and $X'Y'$ at B. Prove that $\angle AOB = 90^0$

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20. An aeroplane flying at a height 300 metre above the ground passes vertically above another plane at an instant when the angles of elevation of the two planes from the same point on the ground are 60° and 45° respectively. Then the height of the lower plane from the ground in metres is

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21. If two different dice are rolled together, the probability of getting an even number of both dice is

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22. Q. For what value of k will k+9, 2k-1 and 2k+7 are the consecutive terms of an A.P.

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23. A ladder leaning against a wall makes an angle of 60° with the horizontal. If the foot of the ladder is 2.5 m away from the wall, find the length of the ladder.

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24. A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of getting neither a red card nor a queen and

(2) a face card

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25. If -5 is a root of the quadratic equation $2x^2 + px - 15 = 0$ and the quadratic equation $p(x^2 + x) + k = 0$ has equal roots, find the value of k.

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26. 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 nearer to A. Find the coordinates of P and Q.

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27. In Fig.2, a quadrilateral ABCD is drawn to circumscribe a circle, with centre O, in such a way that the sides AB, BC, CD and DA touch the circle

at the points P, Q, R and S respectively. Prove that AB + CD = BC + DA.

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28. Prove that the points (3, 0), (6, 4) and (-1, 3) are the vertices of a right-angled isosceles triangle.

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29. The fourth term of an A.P is zero. Prove that the 25th term is triple its 11th term

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30. In the given figure, from an external point P,two tangents PT and PS are drawn to a circle with centre O and radius r.If OP=2r, show that $\angle OTS = \angle OST = 30^\circ$

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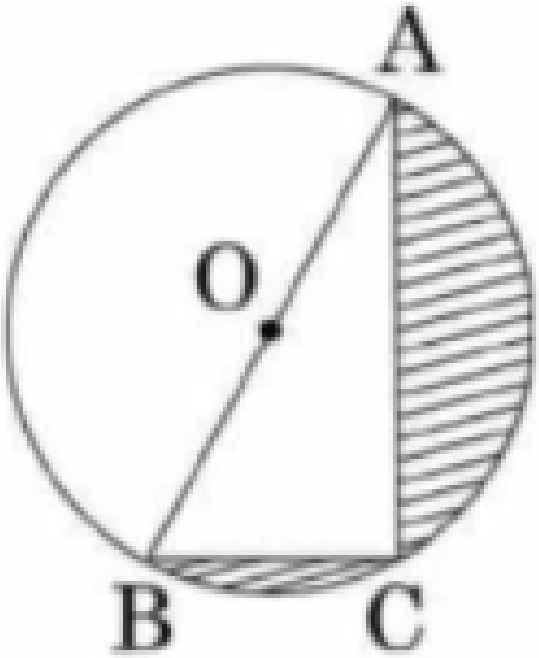
31. In fig. O is the center of a circle such that diameter AB=13cm and AC= 12 cm. BC is joined. Find the area of the shaded region.



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32. If the point P(x, y) is equidistant from the points A(a + b, b-a) and B(a-b, a + b). Prove that bx = ay.

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33. Find the area of the shaded region in Fig. 12.20, if radii of the two concentric circles with centre O are 7 cm and 14 cm respectively and $\angle AOC\backslash \quad = \backslash \quad 40o$

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34. If the ratio of the sum of first n terms of two AP's is (7n+1) : (4n + 27), then find the ratio of their mth terms.

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35. Solve for x: $\frac{1}{(x-1)(x-2)} + \frac{1}{(x-2)(x-3)} = \frac{2}{3}$', x is not equal to 1,2,3 .

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36. A conical vessel whose internal radius is 5 cm and height 24cm is full of water. The water is emptied into a cylindrical vessel with internal radius 10cms. Find the height to which the water rises.

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37. 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.

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38. A man standing on the deck of a ship, which is 10 m above water level, observes the angle of elevation of the top of a hill as 60° and the angle of depression the base of hill as 30°. Find the distance of the hill from the ship and the height of the hill.

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39. Three different coins are tossed together. Find the probability of getting (1) exactly 2 heads (2) atleast 2 heads

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40. Draw a pair of tangent to a circle of radius 5 cm which are inclined to each other at an angle of 60°. Give steps of construction.

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41. . In the given figure, two equal circles, with centres O and O', touch each other at X. OO' produced me the circle with centre O' at A. AC is tangent to the circle with centreO, at the point C. O'D is perpendicular to AC. Find the value of $\frac{DO'}{CO}$.

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42. Solve for x : $\frac{1}{x+1}+\frac{2}{x+2}=\frac{4}{x+4}$

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43. The angle of elevation of the top Q of a vertical tower PQ from a point X on the ground is 60°.From a point y 40 m vertically above X, the angle of elevation the top Q of tower is 45°.Find the height of the tower PQ and the distance PX.(Use $\sqrt{3}=1.73$)

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44. The angle of elevation of the top Q of a vertical tower PQ from a point X on the ground is 60°.From a point y 40 m vertically above X, the angle of elevation the top Q of tower is 45°.Find the height of the tower PQ and the distance PX.(Use $\sqrt{3}=1.73$)

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45. The houses of a row are numbered from 1 to 49. Show that there is a value of x such that the sum of the numbers of the houses preceding the house numbered x is equal to the sum of the no. of the houses following it. Find the value of the x.

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46. A number x is selected at random from the numbers 1, 4, 9, 16 and another number y is selected random from the numbers 1, 2, 3, 4. Find the probability that the value of xy is more than 16.

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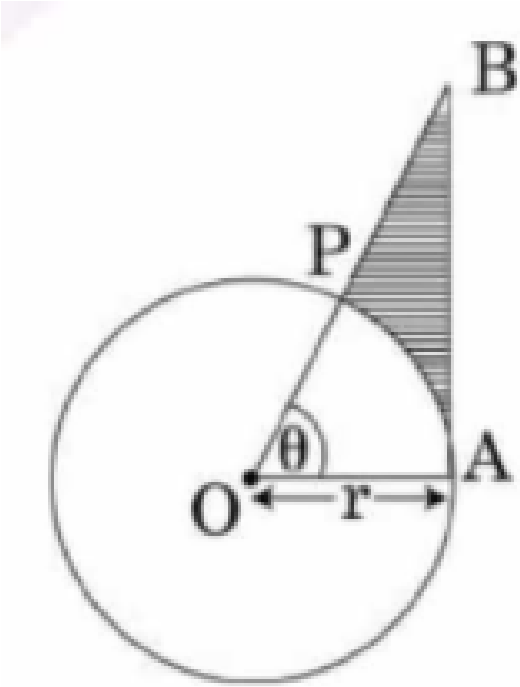
47. In the given figure, is shown a sector OAP of a circle with centre 0, containing $\angle\theta$. AB is perpendicular to the radius OA and meets OP produced at B. Prove that the perimeter of shaded region is

$$r\left[\tan\theta+\sec\theta+\pi\frac{\theta}{180}-1\right]$$



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48. A motor boat whose speed is 24 km/hr in still water takes 1 hr more to go 32 km upstream than to return downstream to the same spot. Find the speed of the stream.

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49. If the quadratic equation $px^2 - 2\sqrt{5} + 15 = 0$ has two equal roots, then find value of p.

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50. A tower AB is 20 m high and BC is its shadow on the ground $20\sqrt{3}$ m long. Find the Sun's elevation.

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51. Two different dice are tossed together, Find the probability that the product of the two numbers on the top of the dice is 6.

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52. two tangents RQ and RP are drawn from an external point R to the circle with centre O. If $\angle PRQ = 120^\circ$, then prove that OR= PR+ RQ

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53. Solve the quadratic equation $4x^2 + 4bx - \left(a^2 - b^2\right) = 0$

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54. 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 values of P.

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55. Find the relation between x and y if the points $A(x, y), B(-5, 7)$ and $C(-4, 5)$ are collinear.

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56. The 14th term of an A.P. is twice its 8th term. If its 6th term is -8, then find the sum of its first 20 terms.

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57. Solve for x $\sqrt{3}x^2 - 2\sqrt{2}x - 2\sqrt{3} = 0$

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58. The angle of elevation of an aeroplane from a point P on the ground is 60°. After a flight of 15 seconds, the angle of elevation changes to 30°. If the aeroplane is flying at a constant height of $1500\sqrt{3}$ m, find the speed of the aeroplane

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59. If A and B are $(2, 2) \quad and \quad (2, 4)$, respectively, find the coordinates of P such that $AP = \frac{3}{7}AB$ and P lies on the line segment AB.

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60. The probability of selecting a green marble at random from a jar that contains green,white and yellow marble is 1/3. The probability of selecting a white marble random from the jar is 2/9.If the jar contains 8 yellow marbles, find the total numbers of marbles in the jar

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61. 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 100 per sq. m, find the amount the associations will have to pay. What values are shown by these associations [Use $\pi = \frac{22}{7}$]

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62. A hemisphereical bowl of internal diameter 36cm contains a liquid. This liquid is to be filled in cylindrical bottles of radius 3cm and height 6cm. How many bottles are required to empty.

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63. The diagonal of a rectangular field is 60 metres more than the shorter side. If the longer side is 30 metres more than the shorter side, find the sides of the field.

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64. 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.

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65. A train travels at a certain average speed for a distance of 54 km and then travels a distance of 63 km at an average speed of 6 km/h more than the first speed. If it takes 3 hours to complete the total journey, what is its first speed?

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66. Prove that the length of the tangents drawn from an external point to a circle are equal.

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67. Prove that tangent drawn at the mid point of the are of a circle is pallelar to the chord joing the ends of point of the are

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68. The angle of elevation of the top of a tower from a point A on the ground is 30^0. On moving a distance of 20 metres towards the foot of the tower to a point B the angle of elevation increases to 60^0. Find the height of the ttower and the distance of the tower from the point A.

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69. A card is drawn at random from a well-shuffled deck of playing cards. Find the probability that the card drawn is (a) a spade or an ace (b) a black king (c) neither a jack nor a king (d) either a king or a queen.

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70. 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.

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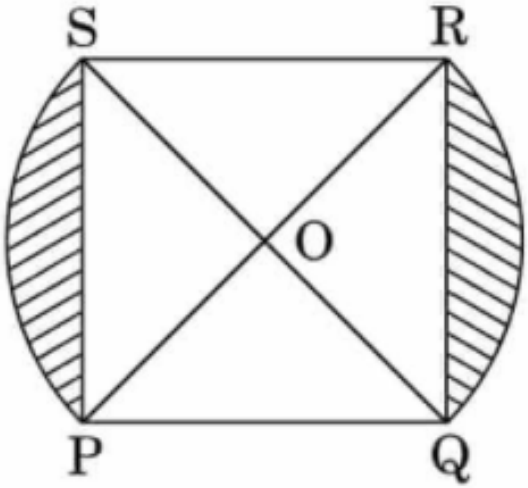
71. In the following figure, PQRS is square lawn with side PQ = 42 metres. Two circular flower beds are there on the sides PS and QR with centre at O, the intersections of its diagonals. Find the total area of the two flower beds (shaded parts).



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72. If $x + k$ is the GCD of $x^2 - 2x - 15$ and $x^3 + 27$, find the value of k

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73. solve for x and y, $x + \left(\frac{6}{y}\right) = 6, 3x - \left(\frac{8}{y}\right) = 5$

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74. Find the sum of first 25 terms of an A.P. whose nth term is $1 - 4n$

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75. D and E are points on the sides CA and CB respectively of a triangle ABC right angled at C. Prove that $AE^2 + BD^2 = AB^2 + DE^2$.

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76. Find the mean of the following frequency distribution:

Classes:	0-20	20-40	40-60	60-80	80-100
Frequency:	15	18	21	29	17

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77. 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 dividing by 7.

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78. A washing machine is available for Rs. 13,500 cash or Rs. 6,500 as cash down payment followed by three monthly instalments of Rs. 2,500 each. Find the rate of interest charged under instalment plan.

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79. Solve the following system of equations graphically : $2x + 3y = 8; x + 4y = 9$

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80. Simplify: $\frac{x}{x-y} - \frac{y}{x+y} - \frac{2xy}{x^2-y^2}$

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81. Which term of the AP: 3, 15, 27, 39, . . . will be 132 more than its 54^{th} term?

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82. In a fig. PA is a tangent to the circle. PBC is a secant & AD bisects angle BAC. Show that triangle PAD is an isosceles triangle.Also show that $\angle CAD = \frac{1}{2}(\angle PBA - \angle PAB)$

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83. Draw a triangle PQR with base QR = 6 cm, vertical angle P = 60° and median through P to the base is of length 4.5 cm.

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84. A toy is in the form of a cone mounted on a hemisphere of same radius 7 cm. If the total height of the toy is 31cm, find the total surface area.

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85. The enrolment of a secondary school in different classes is given below : Class VI VII VIII IX X Enrolment 600 500 400 700 200. Draw a pie chart to represent the above data.

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86. 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.

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87. $\frac{\cos A}{1-\tan A}+\frac{\sin A}{1-\cot A}=\sin A+\cos A$

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88. Show that the points (7, 10), (-2, 5), and (3, -4) are the vertices of an isosceles right triangle.

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89. In what ratio does the line x -y - 2 = 0 divides the line segment joining (3, -1) and (8, 9) ?

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90. A man borrows money from a finance company and has to pay it back in two equal half-yearly instalments of Rs. 7,396 each. If the interest is

charged by the finance company at the rate of 15% per annum, compounded semi-annually, find the principal and the total interest paid.

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91. `If a line is drawn to one side of a triangle to intersect the other two sides in distinct points, prove that the other two sides are divided in the same ratio.

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92. Prove that the sum of opposite pair of angles of a cyclic quadrilateral is 180°

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93. The difference of two numbers is 5 and the difference of their reciprocals is $\frac{1}{10}$ Find the numbers.

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94. The difference of two numbers is 5 and the difference of their reciprocals is $\frac{1}{10}$ Find the numbers.

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95. 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.

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96. A boy standing on a horizontal plane finds a bird flying at a distance of 100 m from him at an elevation of 30°. A girl standing on the roof of 20 metre high building, finds the angle of elevation of the same bird to

be 45°. Both the boy and the girl are on opposite sides of the bird. Find the distance of bird from the girl.

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97. The salary of Mrs. Sarita is Rs 32000 per month. 10% of it is deducted by the employer as provident fund. Of the remaining money, she spends 20% on house rent, 46% on food, 14% on the education of children and 10% another expenses. Rest she saves. Find :

how much does she save every month.

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98. Complete the missing entriesin the following factor tree

A. i) 21 ii) 42

B. i) 42 ii) 21

C. i) 7 ii) 21

D. None

Answer: null

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99. If $(x+p)$is a factor of the polynomial $2x^2+2px+5x+10$. find p.

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100. If $(x+p)$is a factor of the polynomial $2x^2+2px+5x10$. find p.

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101. The common difference of the AP $\frac{1}{p}, \frac{1-p}{p}, \frac{1-2p}{p}$..... is

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102. Show that $x = -3$ is solution of $x^2 + 6x + 9 = 0$

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103. First the term of an A.P is p and its common difference is q. Find its $10th$ term

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104. If tan A=5/12, find the value of (sin A+cos A) sec A

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105. The diagonals of a rhombus measure 16 cm and 30 cm. Find its perimeter

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106. In Figure 1, PQ || BC and AP : PB = 1 : 2.find the ratio of $\frac{ar\Delta APQ}{ar\Delta ABC}$

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107. The surface area of a sphere is 346.5 cm^2, calculate its radius and the volume.

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108. A die is thrown once. Find the probability of getting (i) a prime number; (ii) a number lying between 2 and 6; (iii) an odd number.

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109. Find the class marks of classes 10-25 and 35-55.

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110. Find all the zeros of the polynomial $x^4 + x^3 - 34x^2 - 4x + 120$, if two of its zeroes are 2 and -2

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111. PA and PB are two tangents drawn from an external point P to a circle with centre C and radius=4cm If $PA \perp PB$ then length of each tangent is

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112. In Fig. 2, a circle with centre O is inscribed in a quadrilateral ABCD such that, it touches the sides BC, AB, AD and CD at points P, Q, R and S respectively. If AB=29 cm, AD-23 cm,$\angle B = 90^\circ$ and DS = 5 cm, then the radius of the circle (in cm)

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113. The angle of depression of a car parked on the road from the top of the 150 m high tower is 30°.Find the distance of the car from the tower

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114. 4 A dice is thrown once, then the probability of getting an odd prime number is

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115. Find the probability of getting an even number when a die is thrown

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116. A box contains 90 discs, numbered from 1 to 90. If one disc is drawn at random from the box,find the probability that it bears a prime number < 23.

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117. In Fig. 3, the area of triangle ABC (in sq. units) is :

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118. If $sec4A = \cos ec(A - 20^\circ)$, where 4A is an acute angle, find the value of A.

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119. Solve the following quadratic equation :

$4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$

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120. Find the sum of all three digit natural numbers, which are divisible by 7.

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121. In the given figure, a circle inscribed in a triangle ABC, touches the sides AB, BC and AC at points D, E and F respectively. If AB= 12 cm, BC= 8 cm and AC = 10 cm, find the lengths of AD, BE and CF.

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122. Find the value of K if the point (K,3), (6,-2) and (-3,4) are collinear.

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123. Prove that the parallelogram circumscribing a circle is a rhombus.

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124. E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that $\Delta ABE \sim \Delta CFB$.

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125. A card is drawn at random from a well-shuffled pack of 52 cards. Find the probability that it is neither a ace nor a king.

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126. For what value of k, are the roots of the quadratic equation $kx(x-2)+6=0$ equal ?

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127. Find the number of terms of the AP $18, \frac{31}{2}, 13, \ldots\ldots, -\frac{99}{2}$ and find the sum of all its terms.

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128. 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. [Hint: Let x be any positive integer then it is of the form $3q$, $3q+1$ or $3q+2$ Now square each of these and sho

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129. 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°. If the height of the second pole is 24 m, find the height of the first pole. Use v3 =1.732)

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130. Show that the points (7, 10), (-2, 5), and (3, -4) are the vertices of an isosceles right triangle.

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131. Find the ratio in which the y-axis divides the line segment joining the points (-4, -6) and (10, 12). Also find the coordinates of the point of division.

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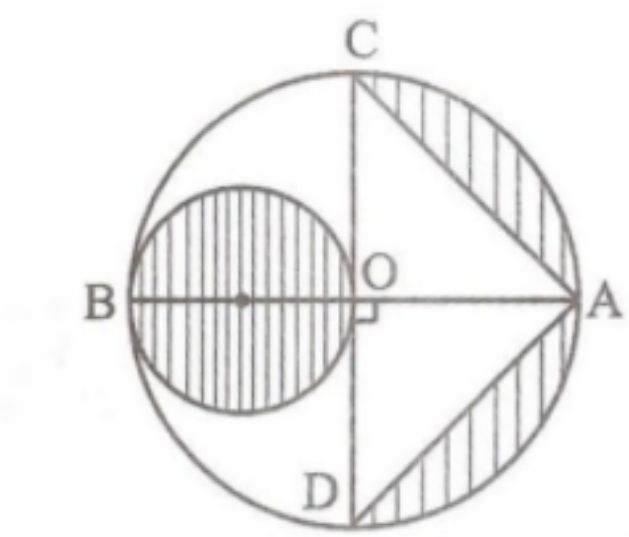
132. In the given figure, AB and CD are two diameters of circles (with centre O) Perpendicular to each other and OD is the diameter of the

smallest circle. If OA = 7cm, Find the area of the shaded region.



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133. A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of the hemisphere is 14 cm and the total height of the vessel is 13 cm. Find the inner surface area of the vessel.

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134. Represent the following pair of equations graphically and write the coordinates of point where the lines intersect y-axis. $x + 3y = 6$ and $2x - 3y = 12$

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135. For what value of n, the n^{th} terms of the following two A.Ps are the same? $1, 7, 13, 19,$ (ii) $69, 68, 67,$

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136. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder. 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.

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137. In a circle of radius 21cm, an arc subtends an angle of 60^0 at the centre. Find (i) the length of the arc (ii) area of the sector formed by the arc. $\left(Use\pi\frac{22}{7}\right)$

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138. Solve for: $\frac{1}{2a+b+2x}=\frac{1}{2a}+\frac{1}{b}+\frac{1}{2x}$

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139. Sum of the areas of two squares is 400 cm. If the difference of their perimeters is 16 cm, find the sides of the two squares.

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140. If the sum of first 7 terms of an AP is 49 and that of 17 terms is 289, find the sum of first n terms.

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141. Prove that the tangent at any point of circle is perpendicular to the radius through the point of contact.

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142. 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 $\angle DOE = 90^\circ$.

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143. The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60°. If the tower is 60 m high, find the height of the building.

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144. A group consists of 12 persons, of which 3 are extremely patient, other 6 are extremely honest and 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 (i) extremely patient (ii) extremely kind or honest. Which of the above values you prefer

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145. Three vertices of a parallelogram ABCD are $A(3, -4), B(-1, -3) and C(-6, 2)$. Find the coordinates of vertiex D and find the area of parallelogram ABCD.

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146. Prove that : (1 + cot A + tan A) (sin A — cos A) = sin A tan A — cot A cos A.

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147. water is flowing at the rate of 2.52 km/h through a cylindrical pipe into a cylindrical tank, the radius of whose base is 40 cm, If the increase in the level of water in the tank, in half an hour is 3.15 m, find the internal diameter of th pipe.

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148. A bucket open at the top, and made up of a metal sheet is in the form of a frustum of a cone. The depth of the bucket is 24 cm and the diameters of its 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 $100cm^2$.

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149. Prove that : (1 + cot A + tan A) (sin A — cos A) = sin A tan A — cot A cos A.

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150. Without using trigonometric tables, evaluate the following:-

$$2\left(\frac{\cos 58^\circ}{\sin 32^\circ}\right) - \sqrt{3}\left(\frac{\cos 38^\circ \cos ec52^\circ}{\tan 15^\circ \tan 60^\circ \tan 75^\circ}\right)$$

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151. If the coordinates of the mid-points of the sides of a triangle are $(3, 4), (4, 6) and (5, 7),$ find its vertices.

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152. If the coordinates of the mid-points of the sides of a triangle are $(3, 4), (4, 6) and (5, 7),$ find its vertices.

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153. In Figure 2, $AD \perp BC$. Prove that $AB^2 + CD^2 = BD^2 + AC^2$.

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154. In Fig. 12.33, ABC is a quadrant of a circle of radius 14 cm and a semicircle is drawn with BC as diameter. Find the area of the shaded region.

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155. A peacock is sitting on the top of a pillar, which is 9m high. From a point 27m away from the bottom of the pillar, a snake is coming to its

hole at the base of the pillar. Seeing the snake the peacock pounces on it. If their speeds are equal, at what distance from the whole is the snake caught?

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156. A peacock is sitting on the top of a pillar, which is 9m high. From a point 27m away from the bottom of the pillar, a snake is coming to its hole at the base of the pillar. Seeing the snake the peacock pounces on it. If their speeds are equal, at what distance from the hole is the snake caught?

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157. The angle of elevation of a jet plane from a point A on the grund is 60^0 . After and flight of 30 seconds, the angle of elevation changes to 30^0. If the jet plane is flying at a constant height of $3600\sqrt{3}m,$ find the speed of the jet plane.

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158. `If a line is drawn to one side of a triangle to intersect the other two sides in distinct points, prove that the other two sides are divided in the same ratio.

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159. An open metal bucket is in the shape of a frustum of a cone, mounted on a hollow cylindrical base made of the same metallic sheet. The diameters of the two circular ends of the bucket are 45 cm and 25 cm, the total vertical height of the bucket is 40 cm and that of the cylindrical base is 6 cm. Find the area of the metallic sheet used to make the bucket, where we do not take into account the handle of the bucket. Also, find the volume of water the bucket can hold.

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160. If the radii of the circular ends of a conical bucket of height 16 cm are 20 cm and 8 cm, find the capacity and total surface area of the bucket. [Use pi= 22/7]

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161. Find mean, median and mode of the following data :

Classes	Frequency
0 – 20	6
20 – 40	8
40 – 60	10
60 – 80	12
80 – 100	6
100 – 120	5
120 – 140	3

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162. Find mean, median and mode of the following data : 10, 12, 14, 16, 14

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163. LCM of two numbers x and y is 720 and the LCM of numbers 12x and 5y is also 720. The number y is

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164. If 1 is a zero of the polynomial $p(x) = ax^2 — 3(a — 1)x - 1$, then find the value of a.

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165. In ΔLMN, $\angle L = 50^\circ$ and $N = 60^\circ$. If $\Delta LMN \sim \Delta PQR$, then find angle Q.

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166. If $\sec^2\theta(1 + \sin\theta)(1 — \sin\theta) = k$, then find the value of k.

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167. If the diameter of a semicircular protractor is 14 cm, then find its perimeter.

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168. Find the number of solutions of the following pair of linear equations: $x + 2y - 8 = 0$ and $2x + 4y = 16$

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169. Find the discriminant of the quadratic equation $3\sqrt{3}x^2 + 10x + \sqrt{3} = 0.$

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170. If a, b and c are three consecutive coefficients terms in the expansion of $(1+x)^n$, then find n.

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171. In the given figure, triangle ABC is circumscribing a circle. Find the length of BC, if AF=3 cm, FB=4 cm and AC= 9 cm

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172. Two coins are tossed simultaneously. Find the probability of getting exactly one head.

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173. Find all the zeroes of the polynomial x^3+3x^2-2x-6, if two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$.

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174. Which term of the A.P. 3,15,27, 39, ... will be 120 more than its 21st term?

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175. ΔABD is a right triangle, right-angled at A and $AC \perp BD$. Prove that $AB^2 = BC \times BD$.

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176. Find the value of $\tan 60^\circ$ geometrically

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177. Is the rational number $\frac{441}{2^2 5^7 7^2}$ a terminating or a non-terminating decimal representation ?

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178. If the points $A(4, 3) and B(x, 5)$ are on the circle with centre $O(2, 3)$, find the value of x.

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179. Prove that $2\sqrt{3}$ is an irrational number

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180. $\frac{ax}{b} - \frac{by}{a} = a + b, ax - by = 2ab$

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181. If alpha,beta are the zeroes of a polynomial, such that $\alpha + \beta = 6$ and $\alpha . \beta = 4$, then write the polynomial.

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182. 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.

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183. If the sum of first p terms of an AP is $ap^2 + bp$ find the common difference

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184. 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 3/4 times the corresponding sides of the first triangle.

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185. S and T are points on the sides PQ and PR, respectively of ΔPQR, such that PT = 2 cm, TR = 4 cm and ST is parallel to QR. Find the ratio of the areas of ΔPST and ΔPQR.

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186. In Figure 3, $AD \perp BC$ and $BD = \frac{1}{3}CD$. Prove that $2CA^2 = 2AB^2 + BC^2$.

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187. 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

Watch Video Solution

188. 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

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189. In Fig. 2, ΔAHK is similar to ΔABC. If $AK = 10cm$, $BC = 3.5cm$ and $HK = 7cm$, find AC. -

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190. Find the area of the quadrilateral whose vertices, taken in order, are $(-4, -2), (-3, -5), (3, -2)$ and $(2, 3)$.

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191. The area of an equilateral triangle is $49\sqrt{3}cm^2$. Taking each angular point as shown in Figure. Find the area of the triangle not included in the circle.

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192. A die is thrown twice. What is the probability that (i) 5 will not come up either time? (ii) 5 will come up at least once? [Hint: Throwing a die twice and throwing two dice simultaneously are treated as the same experiment]

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193. 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

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194. Prove that the length of the tangents drawn from an external point to a circle are equal.

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195. If A(1, 2), B(4, 3) and C(6, 6) are the three vertices of a parallelogram ABCD, find the coordinates of the fourth vertex D.

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196. An aeroplane when flying at a height of 4000m from the ground passes vertically above another aeroplane at an instant when the angles of the elevation of the two planes from the same point on the ground are $60^0 \& 45^0$ respectively. Find the vertical distance between the aeroplanes at that instant.

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197. 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.

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198. During the medical check-up of 35 students of a class, their weights were recorded as follows: Draw a less than type ogive for the given data. Hence obtain the median weight from the graph and verify the result by using the formula. 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

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199. A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of getting neither a red card nor a queen and (2) a face card

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200. If two zeroes of the polynomial $x^3 - 4x^2 - 3x + 12$ are $\sqrt{3}$ and $-\sqrt{3}$, then find its third zero.

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201. Write the value of k for which the system of equations $x + y - 4 = 0$ and $2x + ky - 3 = 0$ has no solution

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202. In an A.P., the first term is 2, the last term is 29 and sum of the terms is 155. Find the common difference of the A.P.

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203. Prove that the parallelogram circumscribing a circle is a rhombus.

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204. The roots of the quadratic equation $2x^2 - x - 6 = 0(a)$-2,3/2(b) 2,-3/2(c)-2,-3/2(d)2,3/2`

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205. If the n^{th} term of an A.P., is $(2n + 1)$, then the sum of its first three terms is (a) 6n+3 (b) 15 (c) 12 (d) 21

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206. Without using trigonometric tables, find the value of the following expression :

$$\frac{\sec(90^\circ - \theta).\cos ec\theta — \tan(90^\circ - \theta)\cot\theta + \cos^2 25^\circ + \cos^2 65^\circ}{3\tan 27^\circ.\tan 63^\circ}$$

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207. From a point Q, 13 cm away from the centre of a circle, the length of tangent PQ to the circle is 12 cm. The radius of the circle (in cm) is

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208. AP, AQ and BC are tangents to the circle. If AB = 5 cm, AC = 6 cm and BC = 4 cm, then the length of AP (in cm) is

A. a) 7.5

B. b) 15

C. c)10

D. d) 9

Answer: null

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209. Find the area of a quadrant of a circle whose circumference is 22 cm.

Watch Video Solution

210. Prove that $2 - 3\sqrt{5}$ is an irrational number.

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211. A solid right circular cone is cut into two parts at the middle of its height by a plane parallel to its base. The ratio of the volume of the smaller cone to the whole cone is: 1:2 (b) 1:4 (c) 1:6 (d) 1:8

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212. A kite is flying at a height of 30m from the ground. The length of string from the kite to the ground is 60m. Assuming that three is no slack

in the string, the angle of elevation of the kite at the ground is: 45^0 (b) 30^0 (c) 60^0 (d) 90^0

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213. The sum of numerator and denominator of a fraction is 3 less than twice the denominator. If each of the numerator and denominator is decreased by 1, the fraction becomes $\frac{1}{2}$ Find the fraction.

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214. The distance of the point $(-3, 4)$ from the x-axis is : a) '3(b)-3` (c) 4 (d) 5

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215. In an AP, the sum of first ten terms is -150 and the sum of its next ten terms is -550 Find the AP

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216. Point $P(5, -3)$ is one of the two points of trisection of the line segment joining the points $A(7, -2) and B(1, -5)$ near to A . Find the coordinates of the other point of trisection.

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217. Cards bearing numbers 2, 3, 4, ..., 11 are kept in a bag. A card is drawn at random from the bag. The probability of getting a card with a prime number is

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218. In Fig. 3, ABC is a right triangle, right angled at C and D is the mid-point of BC. Prove that $AB^2 = 4AD^2 - 3AC^2$.

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219. Find the value of p for which the roots of the equation $px(x-2)+6=0$, are equal.

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220. How many two-digit numbers are divisible by 3?

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221. In figure,a right triangle ABC,circumscribes a circle of radius r.If AB and BC are of length 8 cm and 6 cm respectively, find the value of r.

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222. Prove the following identities:

$$\frac{\tan A}{1-\cot A}+\frac{\cot A}{1-\tan A}=1+\tan A+\cot A=1+\sec A\cos ecA$$

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223. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

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224. From a rectangular sheet of paper ABCD with AB=40CM and AD=28cm, a semi circular portion with BC as diameter is cut off. Find the area of the remaining paper. $\left(Use\pi = \frac{22}{7}\right)$

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225. A solid sphere of radius 10.5 cm is melted and recast into smaller solid cones, each of radius 3.5cm and height 3cm. Find the number of cones so formed. $\left(Use\pi = \frac{22}{7}\right)$

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226. Construct a triangle ABC in which BC = 8 cm, angle B = 45° and angle C = 30° Construct another triangle similar to Delta ABC such that its sides are 3/4. of the corresponding sides of Delta ABC.

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227. Find the value of k , if the point P (2,4) is equidistant from the points $A(5, k)$ and $B(k, 7)$.

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228. A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of getting neither a red card nor a queen and (2) a face card

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229. Solve the following quadratic equation for x.

$x^2 - 4ax - b^2 + 4a^2 = 0$

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230. Find the sum of all multiples of 7 lying between 500 and 900.

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231. 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.

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232. If $R(x, y)$ is a point on the line segment joining the points $P(a, b) and Q(b, a)$, then prove that $x + y = a + b$

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233. A circle is inscribed in a triangle PQR with PQ = 10 cm, QR = 8 cm and PR = 12 cm. Find the lengths QM, RN and PL.

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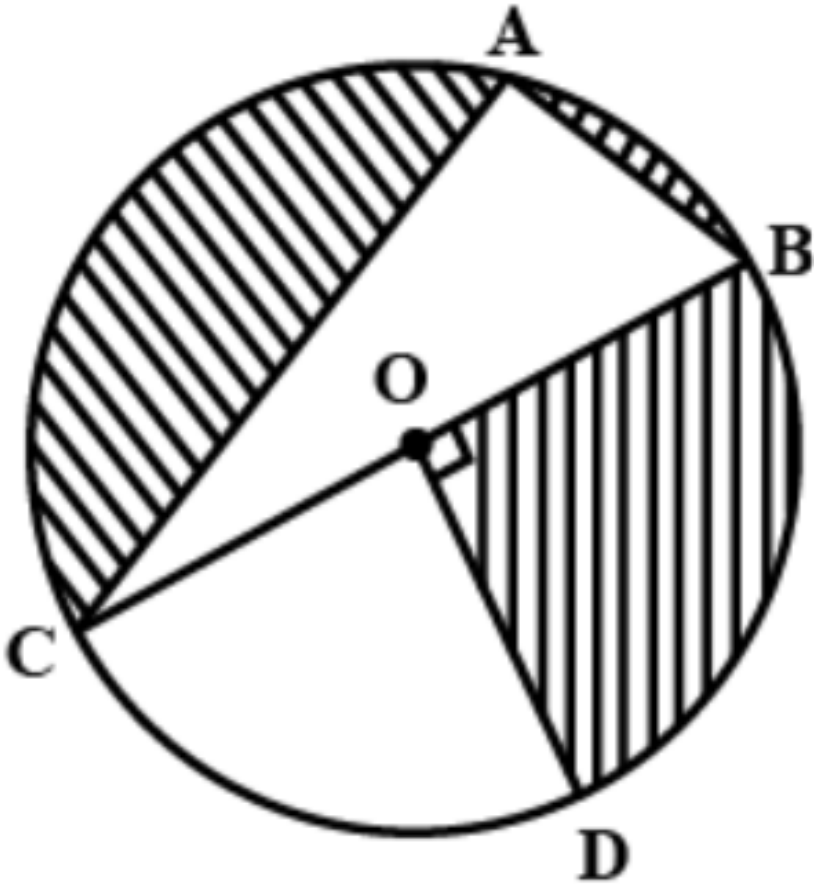
234. In Figure , O is the centre of the circle with AC = 24 cm, AB = 7 cm and $\angle BOD = 90^{\circ}$. Find the area of the shaded region.$[Use\pi = 3 \cdot 14]$



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235. A hemispherical bowl of internal radius 9 cm is full of water. Its contents are emptied in a cylindrical vessel of internal radius 6 cm. Find the height of water in the cylindrical vessel.

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236. The boundary of the shaded region in the given figure consists of three semicircular areas, the smaller ones being equal. If the diameter of the larger one is 14 cm, calculate

(i) the length of the boundary

(ii) the area of the shaded region

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237. The angles of the depression of the top and bottom of the tower is seen from the top of a $60\sqrt{3}$ cliff are 45^{α} and 60^{α} respectively. Find the height of the tower.

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238. Find the coordinates of a point P, which lies on the line segment joining the points A(-2,-3) and B(2. -4) such that AP=$\frac{3}{7}$AB.

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239. If the points $A(x, y), B(3, 6) and C(-3, 4)$ are collinear, show that $x - 3y + 15 = 0$

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240. Cards bearing numbers 1, 3, 5,.....,35 are kept in a bag. A card is drawn at random from the bag. Find the probability of getting a card bearing (i) a prime number less than 15. (ii) a number divisible by 3 and 5.

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241. Three consecutive positive integers are such that the sum of the square of the first and the product of other two is 46, find the integers.

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242. All kings, queens are aces are removed from a pack of 52 cards. The remaining cards are well shuffled and then a card is drawn from it. Find the probability that the drawn card is : a black face card (b) a red card.

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243. 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 the next four terms.

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244. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding medians.

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245. Prove that the length of the tangents drawn from an external point to a circle are equal.

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246. A hemispherical tank full of water is emptied by a pipe at the rate of $\frac{25}{7}$ litres per second. How much time will it take to empty half the tank, if it is 3m in diameter?

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247. From the top of a 7 m high building, the angle of elevation of the top of a tower is 60° and the angle of depression of the foot of the tower is 30°. Find the height of the tower.

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248. A milk container is made of metal sheet in the shape of frustum of a cone whose volume is $104593\frac{3}{7}cm^3$. The radii of its lower and upper circular ends are 8 cm and 20 cm respectively. Find the cost of metal sheet used in making the container at the rate of Rs. $1.\ 40\ per\ cm^2$. (Use $\pi = 22/7$)

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249. If both roots of the equation $x^2 - (m+1)x + (m+4) = 0$ are negative then m equals

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250. If the common difference of an A.P. is 3, then $a_{20} - a_{15}$ is

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251. In Figure 2, AB and AC are tangents to the circle with centre O such that angle BAC = 40°. Then angle BOC is equal to

A. a) 40

B. b) 50

C. c) 140

D. d) 150

Answer: null

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252. The perimeter (in cm) of a square circumscribing a circle of radius a cm,

A. a) 8a

B. b) 4a

C. c) 2a

D. d) 16a

Answer: null

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253. The radius (in cm) of the largest right circular cone that can be cut out from a cube of edge 4.2 cm is

A. a) 4.2

B. b) 2.1

C. c) 8.4

D. d) 1.05

Answer: null

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254. A tower stands vertically on the ground. From a point on the ground, which is $15m$ away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60° . Find the height of the tower.

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255. If $P\left(\frac{a}{2}, 4\right)$ is the mid-point of the line-segment joining the points $A(-6, 5)$ and $B(-2, 3)$, then the value of a is

A. a) -8

B. b) 3

C. c) -4

D. d) 4

Answer: null

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256. If A and B are the points $(-6, 7)$ and $(-1, -5)$ respectively, then the distance 2AB is equal to

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257. One card is drawn from a well-shuffled deck of 52 cards. Calculate the probability that the card will (i) be an ace. (ii) not be an ace.

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258. Find the value of m so that the quadratic equation $mx(x-7)+49=0$ has two equal roots.

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259. Find how many two-digit numbers are divisible by 6.

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260. In Figure 3, a circle touches all the four sides of a quadrilateral ABCD whose sides are AB = 6 cm, BC = 9 cm and CD = 8 cm. Find the length of side AD.

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261. Draw a line segment AB of length 7 cm. Using ruler and compasses, find a point P on AB such

A. that AP/BP = 3/5

B. null

C. null

D. null

Answer: null

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262. Find the perimeter of the shaded region if ABCD is a square of side 21 cm APB & CPD are semicircles. (Use$\pi = \frac{22}{7}$)

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263. Two cubes each of volume $125cm^3$ are joined end to end together. Find the total surface area of the resulting cuboid.

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264. Find the values of y for which the distance between the points $P(2, \ 3) \ and \ Q(10, \ y)$ is 10 units.

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265. A ticket is drawn at random from a bag containing tickets numbered from 1 to 40. Find the probability that the selected ticket has a number

which is a multiple of 5.

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266. . Find the roots of the following quadratic equation : $x^2 - 3\sqrt{5}x + 10 = 0$

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267. Find an A.P. whose fourth term is 9 and the sum of its sixth term and thirteenth term is 40.

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268. Draw a pair of tangent to a circle of radius 5 cm which are inclined to each other at an angle of 60°. Give steps of construction.

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269. 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.

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270. An open metal bucket is in the shape of a frustum of a cone of height 21 cm with radii of its lower and upper ends as 10 cm and 20 cm respectively. Find the cost of milk which can completely fill the bucket at Rs. 30 per litre.

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271. Point (x,4) lies on the line segment joining the points A (-5, 8) and B (4,-10) Find the ratio in which point P divides the line segment AB. Also find the value of x?

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272. Let $A(3, 2), B(-4, 1), C(-3, 1)$ and $D(2, -4)$ be the vertices of a quadrilateral ABCD CD Find area of the quadrilateral formed by the mid-points of the sides of quadrilatdateral

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273. From the top of a vertical tower, the angles of depression of two cars, in the same straight line with the base of the tower, at an instant are found to be 45° and 60°. If the cars are 100 m apart and are on the same side of the tower, find the height of the tower.

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274. Two dice are rolled once. Find the probability of getting such numbers on two dice whose product is perfect square.

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275. Prove that the tangent at any point of circle is perpendicular to the radius through the point of contact.

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276. The first and the last terms of an AP are 17 and 350 respectively. If the common difference is 9, how many terms are there and what is then sum?

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277. A train travels 180 km at a uniform speed. If the speed had been 9 km/hour more, it would have taken 1 hour less for the same journey. Find the speed of the train.

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278. Three circles each of radius 3.5 cm are drawn in such a way that each of them touches the other two. Find the area enclosed between these three circles (shaded region).

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279. Water is flowing at the rate of 15 km/hour through a pipe of diameter 14 cm into a cuboidal pond which is 50 m long and 44 m wide. In what time will the level of water in the pond rise by 21 cm ?

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280. The angle of elevation of the top of a vertical tower from a point on the ground is 60°. From another point 10 m vertically above the first, its angle of elevation is 30°. Find the height of the tower.

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281. The roots of the quadratic equation $2x^2 - x - 6 = 0$ are

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282. If the n^{th} term of an A.P., is $(2n + 1)$, then the sum of its first three terms is (a) 6n+3 (b) 15 (c) 12 (d) 21

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283. From a point Q, 13 cm away from the centre of a circle, the length of tangent PQ to the circle is 12 cm. The radius of the circle (in cm) is

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284. AP, AQ and BC are tangents to the circle. If AB = 5 cm, AC = 6 cm and BC = 4 cm, then the length of AP (in cm) is

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286. A solid right circular cone is cut into two parts at the middle of its height by a plane parallel to its base. The ratio of the volume of the smaller cone to the whole cone is: 1:2 (b) 1:4 (c) 1:6 (d) 1:8

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287. A kite is flying at a height of 30m from the ground. The length of string from the kite to the ground is 60m. Assuming that there is no slack in the string, the angle of elevation of the kite at the ground is: 45^0 (b) 30^0 (c) 60^0 (d) 90^0

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288. The distance of the point $(-3, 4)$ from the x-axis is : 3 (b) -3 (c) 4 (d) 5

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289. Point $P(5, -3)$ is one of the two points of trisection of the line segment joining the points $A(7, -2) and B(1, -5)$ near to A . Find the coordinates of the other point of trisection.

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290. Cards bearing numbers 2, 3, 4, ..., 11 are kept in a bag. A card is drawn at random from the bag. The probability of getting a card with a prime number is

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291. Find the value of p for which the roots of the equation $px(x-2)+6=0,$ are equal.

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294. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

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295. From a rectangular sheet of paper ABCD with AB=40CM and AD=28cm, a semi circular portion with BC as diameter is cut off. Find the area of the remaining paper. $\left(Use\pi = \frac{22}{7}\right)$

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296. A solid sphere of radius 10.5 cm is melted and recast into smaller solid cones, each of radius 3.5cm and height 3cm. Find the number of cones so formed. $\left(Use\pi = \frac{22}{7}\right)$

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297. Find the value of k , if the point P (2,4) is equidistant from the points $A(5, k)$ and $B(k, 7)$.

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298. A card is drawn at random from a well-shuffled pack of 52 cards. Find the probability that it is neither a ace nor a king.

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299. Solve the following quadratic equation for x.

$x^2 - 4ax - b^2 + 4a^2 = 0$

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300. Solve the following quadratic equation for x.

$x^2 - 4ax - b^2 + 4a^2 = 0$

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301. A storage tank consists of a circular cylinder with a hemisphere adjoined on either end. If the external diameter of the cylinder be 1.4m

and its length be 8m, find the cost of painting it on the outside at the rate of Rs. 10 per m^2.

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302. A circle is inscribed in a triangle PQR with PQ = 10 cm, QR = 8 cm and PR = 12 cm. Find the lengths QM, RN and PL.

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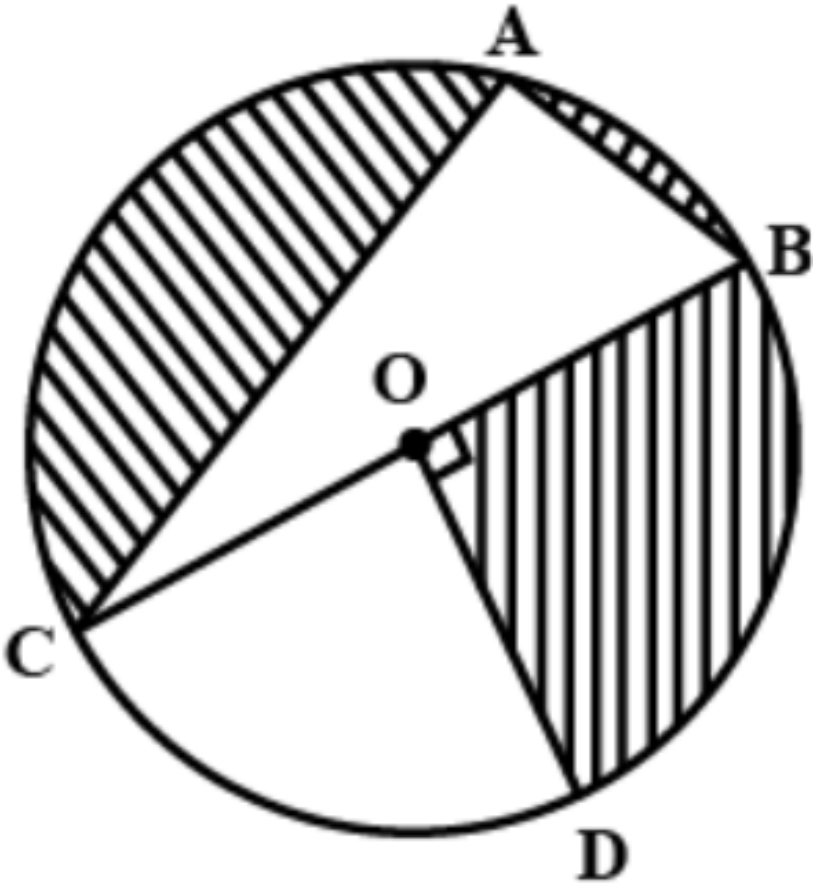
303. In Figure 6, O is the centre of the circle with AC = 24 cm, AB = 7 cm and $\angle BOD = 90^\circ$. Find the area of the shaded region.$[Use\pi = 3 \cdot 14]$



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304. A hemispherical bowl of internal radius 9 cm is full of water. Its contents are emptied in a cylindrical vessel of internal radius 6 cm. Find the height of water in the cylindrical vessel.

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305. The angles of the depression of the top and bottom of the tower is seen from the top of a $60\sqrt{3}$ cliff are 45^{α} and 60^{α} respectively. Find the height of the tower.

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306. Find the coordinates of a point P, which lies on the line segment joining the points A(-2,-3) and B(2. -4) such that AP=$\frac{3}{7}$AB.

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307. If the points $A(x, y), B(3, 6) and C(-3, 4)$ are collinear, show that $x - 3y + 15 = 0$

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308. All kings, queens are aces are removed from a pack of 52 cards. The remaining cards are well shuffled and then a card is drawn from it. Find the probability that the drawn card is : a black face card (b) a red card.

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309. 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 the next four terms.

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310. Prove that the length of the tangents drawn from an external point to a circle are equal.

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311. Prove that the length of the tangents drawn from an external point to a circle are equal.

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312. A hemispherical tank,full of water, is emptied by a pipe at the rate of $\frac{25}{7}$ liters per second.how much time will it take to empty half the tank if the diameter of the base of the tank is 3 m.

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313. A military ten of height 8.25m is in the form of a right circular cylinder of base diameter 30m and height 5.5m surmounted by right circular cone of same base radius. Find the length of the canvas use in making the tent. If the breadth of the canvas is 1.5m.

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314. The angles of elevation and depression of the top bottom of a light-house from the top of a 60m high building are $30^0 and 60^0$ respectively. Find the difference between the heights of the light house and the building. the distance between the light-house and the building.

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315. 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.

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316. In an A.P. first term is 5, last term is 45 and sum = 400 . Find the no. of terms and common difference of A.P.

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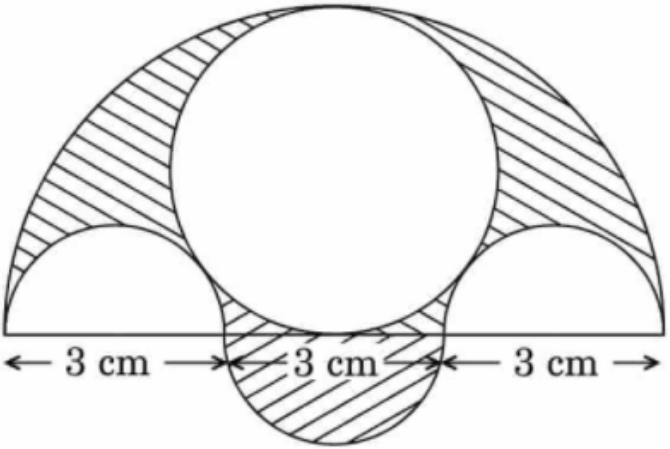
317. Three semicircles each of diameter 3 cm, a circle of diameter 4·5 cm and a semicircle of radius 4·5 cm are drawn in the given figure. Find the area of the shaded region.



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318. A solid iron rectangular block of dimensions 4.4 m , 2.6 m and 1 m is cast into a hollow cylindrical pipe of internal radius 30 cm and thickness 5 cm.Find the length of the pipe.

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319. Prove the following identity, where the angles involved are acute angles for which the expressions are defined. (vii) $\frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta} = \tan\theta$

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

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321. What is the value of $\left(\cos^2 67^\circ - \sin^2 23^\circ\right)$?

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322. Find the distance of point P(x,y) from the origin

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323. If x=3 is one root of the quadratic equation $x^2 - 2kx - 6 = 0$, then find the value of k

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324. What is the HCF of the smallest prime number and the smallest composite number?

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

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326. In an A.P., if the common difference (d)=-4 and the seventh term (a_7) is 4 then find the first term

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327. 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

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328. Two different dice are tossed together. Find the probability (i) of getting a doublet (ii)of getting a sum of 10, of the numbers on two dice

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329. Find the ratio in which (4,m) divides the line segment joining A(2,3) and B(6,-3). Hence find m

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330. A bucket open at the top, and made up of a metal sheet is in the form of a frustum of a cone. The depth of the bucket is 24 cm and the diameters of its 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 Crn . | USe TC-3. f metal sh d in itat th f Rs 10 per 100 cm“. [U 3.14

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331. Given that $\sqrt{2}$ is a irrational prove that $\left(5+3\sqrt{2}\right)$ is an irrational number

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332. Find the sum of first 8 multiples of 3.

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333. As observed from the top of a 100 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 one on the same side of the lighthouse, find the distance between the two ships.

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334. 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.

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335. While boarding an aeroplane, a passenger got hurt. The pilot showing promptness and concern, made arrangements to hospitalise the injured and so the plane started late 30 minutes to reach the destination, 1500 km away in time, the pilot increased the speed by 100 km/hr. Find the original speed/hour of the plane.

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336. A train travels at a certain average speed for a distance of 63km and then travels a distance of 72km at an average speed of 6 km/hr more than its original speed. If it takes 3 hours to complete the total journey, what is its original average speed?

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337. Prove that the area of equilateral triangle described on the side of a square is half the area of the equilateral triangle described on its diagonal.

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338. In an equilateral triangle ABC, D is a point on side BC such that $BD = \frac{1}{3}BC$. Prove that $9AD^2 = 7AB^2$.

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339. (Pythagoras's Theorem) Prove by vector method that in a right angled triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

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340. If the areas of two similar triangles are equal, prove that they are congruent.

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341. The sum of four consecutive numbers in A.P. is 32 and the ratio of the product of the first and last term to the product of two middle terms is 7:15. Find the number

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342. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder. 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.

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343. Find all zeroes of the polynomial $2x^4 - 9x^3 + 5x^2 + 3x - 1$ if two of its zeroes are $2 + \sqrt{3}$ and $2 - \sqrt{3}$

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344. A heap of rice is in the form of a cone of base diameter 24m and height 3.5 m. Find the volume of the rice. How much canvas cloth is required to just cover the heap

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345. Find HCF and LCM of 404 and 96 and verify that $HCF \times LCM =$ product of the two given numbers

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346. If $\tan 2A = \cot\left(A - 18^0\right)$, where $2A$ is an acute angle, find the value of A.

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347. If $4\tan\theta = 3$ evaluate $\dfrac{4\sin\theta - \cos\theta + 1}{4\sin\theta + \cos\theta - 1}$

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348. If $A(-2, -1), B(a, 0), C(4, b) and D(1, 2)$ are the vertices f a parallelogram, find the values of a and b

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349. 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.

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350. Prove that the length of the tangents drawn from an external point to a circle are equal.

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351. In Fig. 1. ABCD is a rectangle. Find the values of x and y

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352. Find the area of the shaded region in Fig. 3, 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 $\pi = 3.14$]

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353. The table below shows Salary of 280 persons. Calculate the median salary of the data.

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354. Find the value of a so that the point $(3, a)$ lies on the line represented by $2x - 3y = 5$.

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355. The HCF of two numbers a and b is 5 and their LCM is 200. Find the product ab.

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356. Cards marked with numbers 5 to 50 Cards marked with numbers 5 to 50 are placed in a box and mixed thoroughly, A card is drawn from the box at random. Find the probability that the number on the card taken out is (i) prime number less than 10 (ii) a number which is a perfect square

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357. Prove that : $\left(\frac{\tan\theta}{1-\tan\theta}\right)-\left(\frac{\cot\theta}{1-\cot\theta}\right)=\frac{\cos\theta+\sin\theta}{\cos\theta-\sin\theta}$

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358. If $\cos\theta+\sin\theta=\sqrt{2}\cos\theta,$ show that $\cos\theta-\sin\theta=\sqrt{2}\sin\theta$

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359. For what value of k does the system of linear equations $2x + 3y = 7$ and $(k-1)x + (k+2)y = 3k$ have an infinite number of solutions

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360. Find the value of k for which $x = 2$ is a solution of the equation $kx^2 + 2x - 3 = 0$

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361. Prove that $\sqrt{5}$ is irrational.

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362. The 17^{th} term of an AP exceeds its 10^{th} term by 7. Find the common difference.

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

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364. Find all the zeroes of the polynomial $x^4 + x^3 - 14x^2 - 2x + 24$ if two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$.

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365. The midpoint of the line segment joining A(29,4) and B(-2,3b) is C(2a+1,1).Find the values of a and b.

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366. If S_n the sum of first n terms of an AP is given by $2n^2 + n$, then find its nth term.

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367. If in an AP a=15, d=-3 and $a_n = 0$. Then find the value of n.

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368. 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.

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369. A part of monthly hostel charges is fixed and the remaining depends on the number of days one has taken food in the mess. When a student A

takes food for 25 days he has to pay 4500 as hostel charges whereas a student who takes B food for 30 days, pays 5200 as hostel charges. Find the fixed charges per month and the cost of food per day.

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370. For what value of P, points (2,1),(P, -1) and (-1,3) are collinear

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371. A juice seller was serving his customers using glasses. The inner diameter of the cylindrical glass was 5 cm, but the bottom of the glass had a hemispherical raised portion which reduced the capacity of the glass. If the height of a glass was 10 cm, find the apparent capacity of the glass and its actual capacity.

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372. In a triangle ABC, $B = 90^\circ$ and D is the mid-oint of BC then prove that $AC^2 = AD^2 + 3CD^2$

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373. If $\sin x + \cos y = 1$,$x = 30^0$ and y is an acute angle. Find the value of y

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374. A cylindrical bucket, 32 cm high and with radius of base 18 cm, is filled with sand. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, find the radius and slant height of the heap.

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375. Find the value of $(\cos 48^\circ - \sin 42^\circ)$

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376. A train travels 360 km at a uniform speed. If the speed had been 5km/hr more, it would have taken 1 hour less for the same journey. Form the quadratic equation to find the speed of the train.

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377. In figure, three sectors of a circle of radius 7 cm, making angles of $60^\circ, 80^\circ$ and 40° at the center are shaded. Find the area of the shaded region.

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378. The area of two similar traingles are 25 sq cm and 121 sq cm. Find the ratio of their corresponding sides

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379. Solve $\frac{1}{a+b+x}=\frac{1}{a}+\frac{1}{b}+\frac{1}{x}, a+b\neq 0$

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380. Show that any positive odd integer is of the form $6q+1$ or $6q+3$ or $6q+5$, where q is some integer

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381. The sum of first p- terms terms of an A.P. is q and the sum of first q terms is p, find the sum of first (p + q)

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382. Prove that the parallelogram circumscribing a circle is a Rhombus.

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383. Find the HCF of 612 and 1314 using prime factorisation.

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384. Construct an isosceles triangle whose base is 8 cm and altitude 4 cm and then another triangle whose sides are $\frac{3}{4}$ times the corresponding sides of the isosceles triangle.

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385. A boy standing on a horizontal plane finds a bird flying at a distance of 100 m from him at an elevation of 30°. A girl standing on the roof of

20 metre high building, finds the angle of elevation of the same bird to be 45°. Both the boy and the girl are on opposite sides of the bird. Find the distance of bird from the girl.

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386. If the square of one side of a triangle is equal to the sum of the squares of the other two sides then the triangle is a right triangle with the angle opposite the first sides as right angle.

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387. The following table gives the number of participants in a yoga camp:

$$\begin{bmatrix} \text{Age in years} & 20-30 & 30-40 & 40-50 & 50-60 & 60-70 \\ \text{No. of Participants} & 8 & 40 & 58 & 90 & 83 \end{bmatrix}$$

. Find the modal age of the participants.

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388. An open metallic bucket is in the shape of the frustum of the cone. If the diameters of the two circular ends of the bucket are 45 cm and 25 cm and the vertical height of the bucket is 24cm, find the area of the metallic sheet used to make the bucket. Also find the volume of water it an hold. (Use $\pi = \frac{22}{7}$)

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389. The angle of elevation of a jet plane from a point A on the grund is 60^0 . After and flight of 30 seconds, the angle of elevation changes to 30^0. If the jet plane is flying at a constant height of $3600\sqrt{3}m,$ find the speed of the jet plane.

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390. Prove that $\frac{(1+\cot\theta+\tan\theta)(\sin\theta-\cos\theta)}{\sec^3\theta-\cos ec^3\theta} = \sin^2\theta\cos^2\theta.$

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391. Find the value of frequecies in the following frequency distribution table, if n=100 and median is 32

$$\begin{bmatrix} Marks & 0-10 & 10-20 & 20-30 & 30-40 & 40-50 & 50- \\ Numberofstudent & 10 & x & 25 & 30 & y & 1 \end{bmatrix}$$

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392. A child has a die whose 6 faces show the letter as given below: A,B,C,A,A,B. The die is thrown once. What is the probability of getting (i) A (ii) B

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393. Find the sum of the first 100 natural numbers.

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394. AOBC is a rectangle whose three vertices are A(0,-3), O(0,0) and B (4,0). The length of its diagonal is__

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395. For an AP, it is given that first term (a)= 5 and Common Difference (d) = 3 and nth term = 50. Find n and sum of first n terms of AP

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396. The value(s) of k for which the quadratic equation $2x^2 + kx + 2 = 0$ has equal roots, is (a) 4

(b) ± 4

(c) -4

(d) 0

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397. Evaluate $\frac{2\tan 45^\circ \times \cos 60^\circ}{\sin 30^\circ}$

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398. on dividing a polynomial p(x) by x^2- 4, quotient and remainder are found to be x and 3 respectively. the polynomial p(x) is

a) $3x^2$+x -12

b) x^3-4x +3

c) x^2+3x-4

d) x^3-4x-3

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399. In the formula $\bar{x} = a + \left(\frac{\sum f_i u_i}{\sum f_i}\right) \times h, u_i =$

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400. The angle of elevation of the top of a tower from a point on the ground, which is 30m away from the foot of the tower is 30° . Find the height of the tower.

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401. 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. [Hint: Let x be any positive integer then it is of the form $3q$, $3q+1$ or $3q+2$ Now square each of these and sho

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402. Show that $5+2\sqrt{7}$ is an irrational number, where $\sqrt{7}$ is given to be an irrational number.

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403. All concentric circles are..... to each other.

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404. 2 cubes, each of volume 125 cm^3, are joined end to end . Find the surface area of the resulting cuboid.

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405. The radius of a sphere (in cm) whose volume is $12\pi\ cm^3$, is

(A) 3

(B) $3\sqrt{3}$

(C) $3^{\frac{2}{3}}$

(D) $3^{\frac{1}{3}}$

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406. The LCM of two numbers is 182 and their HCF is 13. If one of the numbers is 26, find the other.

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407. In the figure-3, from an external point P, two tangents PQ and PR are drawn to a circle of the radius 4 cm with centre O. If $\angle$ QPR = 90°, then length of PQ is

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408. find the ratio in which the y-axis divides the line segment joining the points (6,-4) and (-2,-7). also find the point of intersection.

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409. Check whether 12^n can end with the digit 0 for any natural number n.

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410. Which of the following is not an AP? (a) -1.2, 0.8, 2.8, ... (b) $3, 3+\sqrt{2}, 3+2\sqrt{2}, 3+3\sqrt{2}, \ldots\ldots$ (c) 4/3, 7/3, 9/3, 12/3, ... (d) -1/5, -2/5, -3/5,...

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411. The present age of a father is three years more than three times the age of the son. Three years hence father's age will be 10 years more than twice the age of the son. Determine their present ages.

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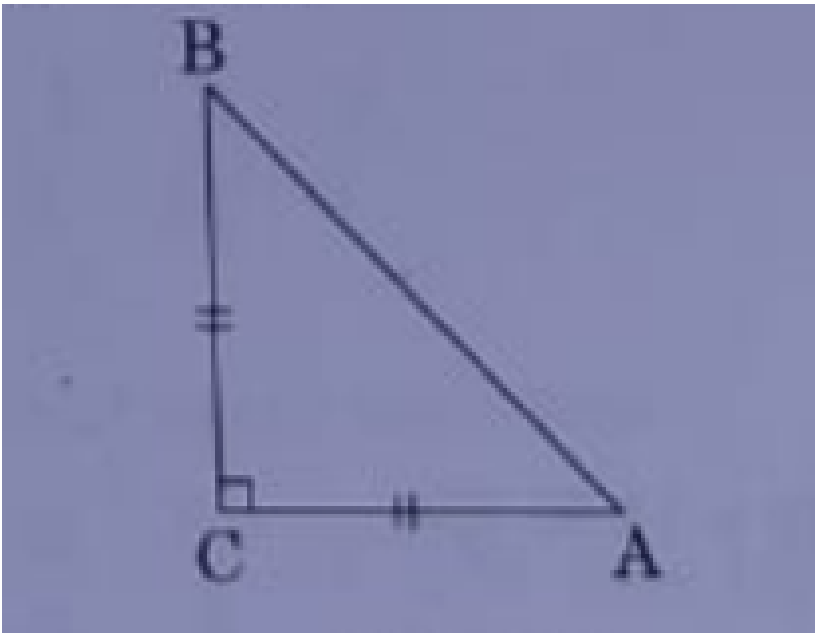
412. in figure, ABC is an isosceles traingle, right angled at C. therefore



a) AB^2=$2AC^2$

b) BC^2=$2AB^2$

c) AC^2=$2AB^2$

d) AB^2=$4AC^2$

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413. Can $\left(x^2-1\right)$ be a remainder while dividing x^4-3x^2+5x-9 by x^2+3 justify your amswer with reasons.

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414. A fraction become 1/3 when 1 is subtracted from the numerator and it becomes 1/4 when 8 is added in the denominator. Find the fraction.

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415. Show that the points (7, 10), (-2, 5), and (3, -4) are the vertices of an isosceles right triangle.

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416. A statue, 1.6 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° and from the same point the angle of elevation of the top of the pedestal is 45°. Find the height of the pedistal

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417. the pair of linear equations $\frac{3x}{2} + \frac{5y}{3} = 7$ and $9x + 10y = 14$ is (a) consistent (b) inconsistent (c) consistent with one solution (d) consistent with many solutions

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418. In Figure-9, a square OPQR is inscribed in a quadrant OAQB of a circle. If the radius of circle is $6\sqrt{2}$ cm, Find the area of the shaded region.

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419. The probability of an event that is sure to happen, is .....

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420. From a quadratic polynomial, the sum and product of whose zeros are (-3) and 2 respectivily.

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421. Read the following passage and answer the questions given at the end :

DIWALI FAIR

A game in a booth at Diwali Fair involves using a spinner first. Then, If spinner stops on an Even Number, the player is allowed to pick a marble from the bag. The spinner and Marbles are represented in Figure. Prizes are given when a black marble is picked. Shweta played the game once.

(i) what is the probability that she will be allowed to pick a marble from the bag.

(ii) Suppose she is allowed to pick a marble from the bag. what is the probability of getting a prize, when it is given bag contains 20 balls out of which 6 are black

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422. The point on the axis which is equidistant from (-4,0) and (10,0) is ,

a) (7,0)

(b) (5,0)

c) (0,0)

d) (3,0)

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423. if A, B and C are interior angles of a $\triangle$ ABC, then show that $\cos\left(\frac{B+C}{2}\right) = \sin\left(\frac{A}{2}\right)$

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424. The distance between the points (m,-n) and (-m,n) is

(A) $\sqrt{m^2+n^2}$

(B) m+n

(C) $2\sqrt{m^2+n^2}$

(D) $\sqrt{2m^2+2n^2}$

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425. A motor boat whose speed is 18 km/h m 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.

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426. The centre of a circle whose end points of a diameter are (-6,3) and (6,4)

a) (8,-1)

b) (4,7)

c) $(0,\frac{7}{2})$

d) $(4,\frac{7}{2})$

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427. Sum of the ares of two squares is 544 m^2. if the difference of their perimeters is 32. find the sides of two squares.

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428. Obtain other zeroes of the polynomial $p(x) = 2x^4 - x^3 - 11x^2 + 5x + 5$ if two of its zeroes are $\sqrt{5}$ and $-\sqrt{5}$.

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429. the distribution given below shows the number of wickets taken by bowlers in one-day cricket matches. find the mean and the median of the number of wickets taken

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430. Simplest form of $\frac{1 + \tan^2 A}{1 + \cot^2 A}$ IS

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431. Theorem 6.6 : The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.

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432. What minimum must be added to $2x^3 - 3x^2 + 6x + 7$ so that the resulting polynomial will be divisible by $x^2 - 4x + 8$?

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433. In Figure-2 PQ is tangent to the circle with centre at O , at the point B. If $\angle$AOB = 100° , then $\angle$ABP is equal to

(A) 50°

(B) 40°

(C) 60°

(D) 80°

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434. The sum of first 14 terms of an AP is 1050 and its first term is 10, then find the 21st term of the AP.

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435. A solid toy is in the form of a hemisphere surmounted by a right circular cone of same radius. The height of the cone is 10 Cm and the radius of the base is 7 cm. Determine the volume of the toy. Also find the area of the coloured sheet required to cover the toy. (Use $\pi = 22/7$ and $\sqrt{149} = 12.2$)

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436. All squares are ___. (congruent/similar)

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437. Find the height of a cone of radius 5 cm and slant height 13 cm.

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438. $8\cot^2 A - 8\,\mathrm{cosec}^2 A$ is equal to

a) 8

b) $\frac{1}{8}$

c) -8

d) $-\frac{1}{8}$

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439. Prove that

$$(\mathrm{cosec} A - \sin A)(\sec A - \cos A) = \frac{1}{(\tan A + \cot A)}.$$

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440. The difference between tow numbers is 26 and the larger number exceeds thrice of the smaller number by 4. Find the number

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441. Find the value of x so that $-6, x, 8$ are in $\Delta A.\ P.$

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442. If a pair of linear equations is consistant , then the lines represented by them are

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443. A quadrilateral ABCD is drawn to circumscribe a circle. Prove that $AB + CD = AD + BC$

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444. If (3,-6) is the mid point of the line segment joining (0,0) and (x,y), then the point (x,y) is

(A) (-3,6)

(B) (6,-6)

(C) (6,-12)

(D) (3/2,-3)

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445. Find the 11^{th} term of the A.P. $-27,\ -22,\ -17,\ -12.....$

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446. In figure, the angle of elevation of the top of a tower AC from a point B on the ground is 60°. If the height of the tower is 20m , find the distance of the point from the foot of the tower.

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447. In the given circle in Figure-1 , number of tangents parallel to tangent PQ is

(A) 0

(B) many

(C) 2

(D) 1

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448. the distance between the points $(3,-2)$ and $(-3,2)$ is

a) $\sqrt{52}$ units

b) $4\sqrt{10}$ units

c) $2\sqrt{10}$ units

d) $\sqrt{40}$ units

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449. Find the roost of the quadratic equation $3x^2 - 4\sqrt{3}x + 4 = 0$

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450. Evaluate $\tan 40^\circ \times \tan 50^\circ$

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451. The total surface area of frustum shaped glass tumbler is $(r_1 > r_2)$

(a) $\pi r_1 l + \pi r_2 l$ (b) $\pi l(r_1 + r_2) + \pi(r_2)^2$ (c) $\frac{1}{3}\pi h\left((r_1)^2 + (r_2)^2 + r_1 r_2\right)$ (d) $\sqrt{h^2 + (r_1 - r_2)^2}$

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452. A container open at the top and made up of a metal sheet, is in the form of a frustum of a cone of height 14 cm with radii of its lower and upper circular ends as 8 cm and 20 cm, respectively. find the capacity of the container.

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453. The probability of an impossible event is

(A) 1

(B) 1/2

(C) not defined

(D) 0

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454. If $\cos A = \sin 42^\circ$, then find the value of A.

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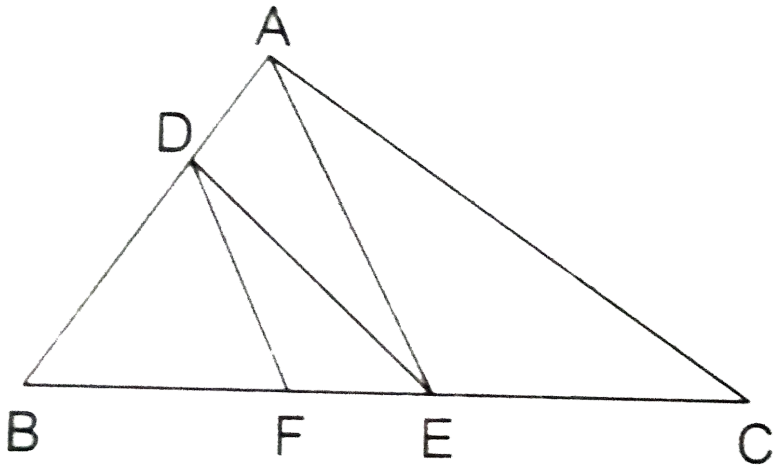
455. In the given figure, $DE||AC$ and $DF||AE$.

Prove that $\frac{BF}{FE} = \frac{BE}{EC}$



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456. A coin is tossed twice, the probability of getting head both the times is

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457. Solve for x and y:

$$\frac{2}{x}+\frac{3}{y}=13, \frac{5}{x}-\frac{4}{y}=-2(x \neq 0 \text{ and } y \neq 0)$$

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458. A line which intersects a circle at two distinct point is called a _____ of the circle.

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

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460. 14 defective bulbs are accidentally mixed with 98 good ones. It is not possible to just look at the bulb and tell whether it is defective or not. One bulb is taken out at random from this lot. Determine the probability that the bulb taken out is a good one.

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461. if the radii of two spheres are in the ratio $2:3$, then the ratio of their respective volumes is ----------.

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462. 120 can be expressed as a product of its prime factors as

(a) $5 \times 8 \times 3$

(b) 15×2^3

(c) $10 \times 2^2 \times 3$

(d) $5 \times 2^3 \times 3$

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463. If 2 is a zero of the polynomial ax^2-2x then the value of 'a' is .....

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464. If ar($\triangle$ PQR) is zero, then the points P,Q and R are ----------.

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465. The following distribution shows the transport expenditure of 100 employees:

A. Find the mode of the distribution.

B. null

C. null

D. null

Answer: null

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466. The discriminant of the quadratic equation $4x^2 - 6x + 3 = 0$ is (A) 12 (B) 84 (C) $2\sqrt{3}$ (D) -12

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467. In Figure 7. find the perimeter of $\triangle ABC$, if AP = 12 cm

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468. Two water taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

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469. A quadrilateral ABCD is drawn to circumscribe a circle. Prove that $AB + CD = AD + BC$

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470. Check whether 6^n can end with the digit '0' (zero) for any natural number n.

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471. A rectangular park is to be designed whose breadth is 3 m less than its length. Its area is to be 4 square metres more than the area of a park that has already been made in the shape of an isosceles triangle with its base as the breadth of the rectangular park and of its altitude 12 m. Find length and breath of the rectangular park .

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472. Find the LCM of 150 and 200.

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473. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points. Prove that the other two sides are divided in the same ratio.

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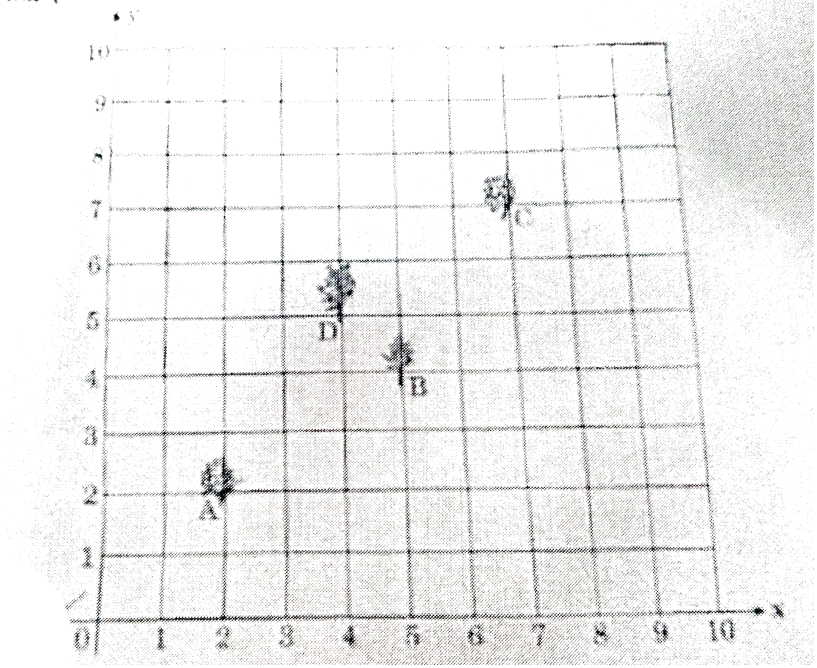
474. Krishna has an apple orchard which has a $10m \times 10m$ sized kitchen garden attached to it. She divides it into a 10×10 grid and puts soil and manure into it. She grows a lemon plants at A, a coriander plant at B, an onion plant at C and a tomato plant at D. Her husband Ram praised her kitchen garden and points out that on joining A, B, C and D they may form a parallelogram. Look at the below figure carefully and answer the following questions :



(i) Write the coordinates of the points A, B, C and D, using the 10×10 grid as coordinate axes.

(ii) Find whether ABCD is a parallelogram or not.

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475.

if $\tan(A+B)=\sqrt{3}$ and $\tan(A-B)=\frac{1}{\sqrt{3}}: 0^\circ < A+B \leq 90^\circ, A >$

find A and B

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476. From the top of a 75m high lighthouse from the sea level the angles of depression of two ships are 30° and 45°. If the two ships are on the opposite sides of the light house then find the distance between the two ships.

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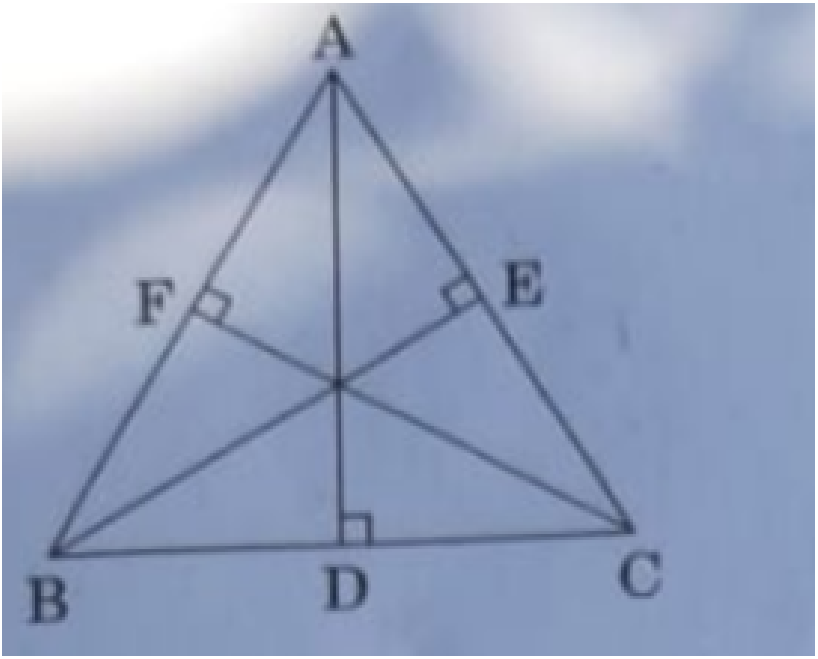
477. In Figure -6 , in an equilateral triangle ABC, AD is perpendicular to BC , BE is perpendicular to AC and CF is perpendicular to AB . Prove that

$4\left(AD^2+BE^2+CF^2\right)=9AB^2$



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478. In figure - 3, $\triangle ABC$ and $\triangle XYZ$ are shown. if AB = 3 CM, BC = 6 cm, AC = $2\sqrt{3}$ cm , $\angle A = 80^\circ$, $\angle B = 60^\circ$, XY = $4\sqrt{3}$ cm , YZ = 12 CM and XZ= 6 cm, then find the value of $\angle Y$

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479. In Figure-5, ABCD is a square with side 7 cm. A circle in drawn [circumscribing the square. Find the area of the shaded region.

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480. Find all the zeros of the polynomial $f(x) = 3x^4 - 4x^3 - 10x^2 + 8x + 8$, if two of its zeros are $\sqrt{2}$ and $-\sqrt{2}$.

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481. In Fig. 12.27, AB and CD are two diameters of a circle (with centre O) perpendicular to each other and OD is the diameter of the smaller circle. If$OA = 7\ cm$, find the area of the shaded region

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482. Divide the polynomial $g(x) = x^3 - 3x^2 + x + 2$ by the polynomial $x^2 - 2x + 1$ and verify the division algorithm.

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