MATHS

BOOKS - V PUBLICATION

CIRCLES

Question Bank

1. Suppose we draw circle with the bottom side of the. triangles in the picture as diameter. Find out whether the top comer of each

triangle is inside the circle, on the circle. or outside the circle.

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2. For each diagonal of thequadrilateral shown, check whether the other two corners are inside, on or outside the circle with that diagonà as diameter.

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3. If circles are drawn with each side of a triangle of sides 5 centimetres, 12 centimetres and 13 centimetres, as diametres,then with respect to each circle, where would be the third vertex?

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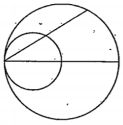
4. In the picture, a circle is drawn with a . line as diameter and a smaller circle with half the line as diameter. Prove that any chord of the

larger circle through the point where the circles meet is bisected by the small circle.



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5. Use a calculator to determine upto two decimal places, the perimeter and the area of the circle in the picture.

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6. The two circles in the. picture cross each other at 'A' and 'B'. The points 'P' and 'Q' are the other ends of the diameters through A.

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i) Prove that 'P, B, Q' lie on a line.

ii) Prove that 'P Q' is parallel to the line jọiriing the centres of the circles and is twice as long as this line.

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7. Prove that the two circles drawn on the two equal sides of an isosceles triangle as diameters pass through the mid point of the third side.

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8. a) Prove that all four circles drawn with the sides of a rhombus as diameters pass through a common point.

$(\#\#VPU_{\top}T_MAT_X\_P01_C02_E01_{008}\_Q01\#\#)$

b) Prove that this is. Itruerior any quadrilateral with adjacent sides equal, as in the picture.

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9. A triangle is drawn by joining a point on a semicircle to the end of the diameter. Then semicircles are drawn with the other two sides as diameter.

'(##VPU_TTT_MAT_X_P01_C02_E01_009_Q01##)'

Prove that the sum of the areas of the blue

and red crescents in the second pictúre is equai to the area of the triangle.

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10. In the figure circles with centres 'A' and 'B' intersect at 'Q' and 'S'. If 'P Q' and 'Q R' bé the diameters, prove that the points 'P_1, S' and 'R' are.lie on the same line.

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11. Á circle is drawn with AB as diameter. Find the position of the points 'C, D, E' related to the circle

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12. In the figure 'triangle ABC' is a right angle.

'(##VPU_TTT_MAT_X_P01_C02_E02_004_Q01##)'

a) If a circle is drawn with AC as diameter find thepösition of 'B'

b) if the circle is drawn with 'BC' as diameter find the position of 'A'.

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13. In quadrilateral 'ABCD, AB=3 cm, BC' '=4 cm, AC=5 cm, /_ A=120^circ' and '/_ C=70^circ .' If we draw the circle with 'AC' as diameter which of the four vertices of ABC would be inside the circle? Which of them would be outside the circle? What about the circle with BD ąs diameter?

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14. In all the pictures given below, 'O' is the centre of the circle and 'A, B, C' are points on. it. Calculate ail angles of 'Delta ABC' and 'triangle OBC' in each.

'(##VPU_TTT_MAT_X_P01_C02_E03_001_Q01##)'

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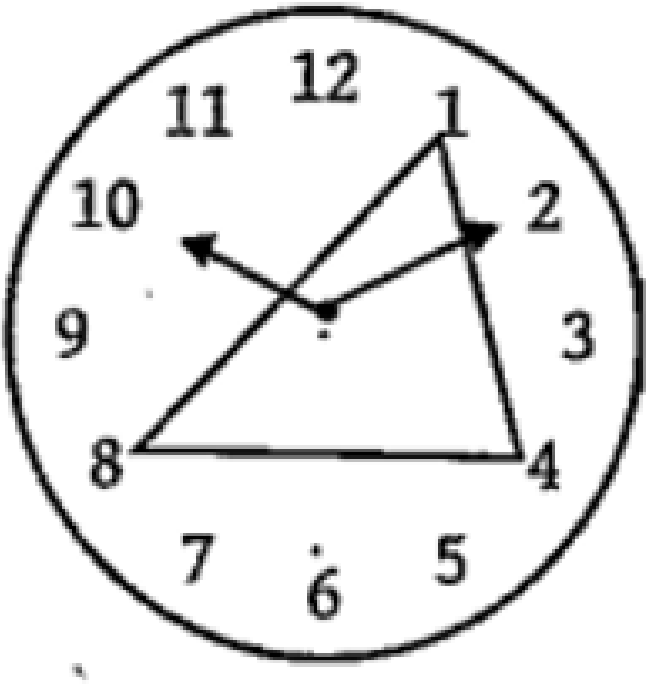
15. The numbers 1,4, 8 on a clock's face are joined to make a triangle.



Calculate the angles of this triangle. How many equilateral triangles can we make by joining numbers on the clock's face?

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16. In each problem below, draw a circle and a chord to divide it into two parts such that the parts are as speciffied,

i) All angles on one part '80^circ'.

ii) All angles on orie part '110^circ'.

iii) Äl angles on one part half of all arigles on the other.

iv) All angles on one part, one and a halfxx the angles on the other.

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17. A rod bent:into an angle is placed with its comer at the centre of a circle and it is found that '1/(10)' of the circle lies with in it. If it is placed with. its corner on another circle, what part of the circle. would be within it?

'(##VPU_TTT_MAT_X_P01_C02_E03_004_Q01##)'

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18. In, the picture, 0 is the centre of the circle and 'A, B, C', are points on it.

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Prove that '/_ O A C+/_ A B C=90^circ'

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19. Draw a triangle of circumradius 3 centimetres and two of the angles '32 (1/2)^circ, 37 (1/2)^circ'

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20. In the picture, 'A B' and 'C D' are mutually perpendicular chords of the circle. Prove that the arcs APC and BQD joined together would make half the circle.

'(##VPU_TTT_MAT_X_P01_C02_E03_007_Q01##)'

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21. In the picture, 'A, B, C, D' are points on a circle centred at '0 .' The lines 'A C' and BD are, extended to meet at 'P'. The line 'A D' and 'B C'

intersect at 'Q'. Prove that the angle which the small arc AB makes.at 0 is the sum of the angles it makes at 'P' and 'Q'.

'(##VPU_TTT_MAT_X_P01_C02_E03_008_Q01##)'

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22. In the figure '/_ ABC=65^circ', what is central angle of arc 'A B C ?'

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23. In the figure 'O' is the centre of the circle. If '/_ POR=110^circ', what is '/_ PSR ?'

'(##VPU_TTT_MAT_X_P01_C02_E04_002_Q01##)'

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24. In the figuré given below 'O' is the centre of the circle. If '/_ A=15^circ' '/_ B=25^circ', what is '/_ AOB'?

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25. In the figure, O is the centre of the circle. Find '/_ ACB'.

'(##VPU_TTT_MAT_X_P01_C02_E04_004_Q01##)'

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26. In the figüre 'A B' is the diameter of the circle. Find the other angles.

'(##VPU_TTT_MAT_X_P01_C02_E04_005_Q01##)'

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27. In the figure given below, find the area of the circle.

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28. If the central angles of a circle is x°, what is angle made by that arc in a point on the alternate arc?

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29. A B' and 'A C' are two chords of the circle. If central angle of arc 'APB' is '90^circ' and arc AQC.is '150^circ', find '/_ BAC'.

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30. In the figure, 'O' is the centre of the circle 'A B' and 'B C' are chords also 'A B=B C' and '/_ OBA=50^circ .' Find '/_ AOB' and '/_ OAC'.

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31. Chords 'AB' and 'CD' of a circle meet at a point P inside the circle: If the lines AC and DB are extended tomeet at point Q outside the circle.

If '/_ A C D=55^circ , /_ A Q D=30^circ', find '/_ C A B , /_ C D B, /_ A B Q' and '/_ A P C' :

'(##VPU_TTT_MAT_X_P01_C02_E04_010_Q01##)'

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32. Calculate the angles of the quadrilateral in the picture and also the angles between their diagonals:

'(##VPU_TTT_MAT_X_P01_C02_E05_001_Q01##)'

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33. Prove that any outer. angle of a cyclic quadrilateral is

equal to the interior angle, at the opposite vertex.

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34. Prove that a parallelogram which is not a rectangle is not cyclic.

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35. Prove that any non-isosceles trapezium is not cyclic.

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36. In the picture, bisectors of adjacent arigles of the quadriláteral ABCD intersect at 'P, Q, R, S .'

'(##VPU_TTT_MAT_X_P01_C02_E05_005_Q01##)'

Prove that PQRS is a cyclic quadrilateral.

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37. i) The two circles below intersect at 'P, Q' and lines through thiese points meet the. circles at 'A, B, C, D'. The lines 'A C' and 'B D' are not parallel. Prove that if 'A C' and BD are. of

equal length, then 'ABCD' is a cyclic quadrilateral.

'(##VPU_TTT_MAT_X_P01_C02_E05_006_Q01##)'

ii). In the picture, the circles on the left and right intersect the middle circle at 'P, Q, R, S ,' the lines joining them meet the left and right circles at 'A', 'B, C, D'. Prove that 'A B C D' is a cyclic quadrilateral.

'(##VPU_TTT_MAT_X_P01_C02_E05_006_Q02##)'

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38. Inthe picture, points 'P, Q_s R' are marked on the sides 'BC, CA, AB' of '/_\ ABC' and the circumcircles of '/_\ A Q R' and '/_\ B R P' are drawn. M, is a point where these circles intersect. Prove that the circumcircle of '/_\' CPQ also passes through 'M' is a point where these circless intersect.

'(##VPU_TTT_MAT_X_P01_C02_E05_007_Q01##)'

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39. O' is the centre of the circle and 'AB' is a chord. 'A C' is the bisector of '/_ O A B'. '/_ OAB=56^circ'

a) Prove that 'O C' and 'A B' are parallel.

b) Find '/_ A B C' and '/_ O B E'.

'(##VPU_TTT_MAT_X_P01_C02_E06_001_Q01##)'

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40. In cyciic quadrilateral PQRS, QR is extended tó 'X .' If '/_ SRX=100^circ' and 'RPS=50^circ',

then what is the measure of RPQ?

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41. Two circles intersect at 'A' and 'B'. The lines KAL, NBM are parallel.

Prove that KLMN is a parallelogram.

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42. ABCD' is a cyclic quadrilateral. If $\angle A = x + 15^\circ$, $\angle B = x - 10^\circ, \angle C = x - 25^\circ$, find each angles.

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43. In the figure 'AB'. is the diameter and CD is parallel to the diameter.

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'A B=8 cm, B D=2 cm', find 'C D'

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44. In the picture, chords AB.and CD of the circle are extended to meet at 'P'.

'(##VPU_TTT_MAT_X_P01_C02_E07_001_Q01##)'

i) Prove that the angles of 'triangle APC' and 'Delta PBD', formed by joining 'AC' and 'BD', are the same.

ii) Prove that 'PA xx PB=PC xx PD'

iii) Prove that if 'P B=P D', then 'A B D C' is an isosceles trapezium.

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45. Draw a rectangle of width 5 centimetres and height 3 centimetres.

i) Draw a rectangle of the same area. with width-6 centimetręs:

ii) Drawa square of the same area.

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46. Draw a square of area

$15cm^2$

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47. Draw a square of area 5 square centimetres in three different ways.

(Remember Pythagoras theorem)

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48. In this picture, a line through the centre of a circle cuts a chord into two parts:

What is the radius of the circle?

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49. In the picture, a line through the centre of a circle meets a chord of the circle:

What are the lengths of the two pieces of the chord?

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50. P is an external point of a circle. A line drawn from 'E' intersects the circle at 'C' and 'D . P C=9', PA '=6' fand 'O' is the centre of the circle. If the shortest distance from 'P' to the circle is equal to. the radius of the circle.

a) What is the radius of the circle?

b) Compute CD.

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51. In the figure 'c P R=4 cm, Q R=5 m', 'PS=3 cm .' What is the length of TS?

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52. In the figure, radius of the circle with centre 0 is '6 cm, PA=4 cm' and 'P B=5 cm .' What is the lenath of OP?

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53. In the figure 'P Q perp S R', also 'P R=5 cm', 'TR=4 cm, ST=9 cm .' What is 'TQ ?'

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54. In the figure, two circles intersect at 'Q' and 'R .'

'(##VPU_TTT_MAT_X_P01_C02_E08_005_Q01##)'

Prove that PA 'xx P B=P C xx P D'.

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55. In the figure, 'O' is the centre of the circle. CD-is a chord which is not perpendicular to the diameter 'A B'. Also 'P A=9 cm, PB=4 cm'

'(##VPU_TTT_MAT_X_P01_C02_E08_006_Q01##)'

a) What is PC 'xx P D' ?

b) Prove that the length of 'P C' and PD. cannot be a natural nümber at a time.

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56. Draw a rectangle of sides 7 centimetres and 5 centimetres. Draw a square of same area.

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57. In the picture below, 'A B C D' is a square with vertices on a circle and XYZ is such an equilateral triangle. 'P' and 'Q' are points on the circles:

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i) How much is '/_ A P B ?'

ii) How much is '/_X QZ' ?

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58. In the figure, 'A B' is a diameter of the circle and the chord 'C D' is perpendicular to 'A B .' If 'C D=4 sqrt5' centimetres and PA = 2 centimetres, find 'A B'.

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59. Examine whether the two quadrilaterals obtained by joining the vertices 'F' and C of a regular hexagon ABCDEF are. cyclic or not? Why?

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60. In the figure, 'P, Q, R' and 'S' are points on the circle with centre at O.

'(##VPU_TTT_MAT_X_P01_C02_E09_003_Q01##)'

If '/_ ROS=80^circ' and '/_ QSR=30^circ', compute the following angles.

i) '/_ O S Q=.....'

if) '/_ S Q R=.....'

iit) '/_ P=.....'

iv) '/_ Q O R=.....'

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61. In the figure, 'C' is the centre of the circle and 'AB', its diameter. triangle PDC is an isosceles triangle.

'(##VPU_TTT_MAT_X_P01_C02_E09_004_Q01##)'

Prove that 'AB^2=4 PD xx DE'.

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62. In the figure, quadrilateral ABCD is cyclic.

'/_ GBC=80^circ'

'/_ A=50^circ'

'(##VPU_TTT_MAT_X_P01_C02_E09_005_Q01##)'

i) Compute the other. angles of the quadrilateral. Find also '/_ A D L'.

ii) Prove that the sum of the exterior angles at opposite vertices of a cyclic quädrilateral is '180^circ .'

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63. Two circles are intersecting at 'Q' and 'C' as shown in the figure. 'R B' is parallel to PA. Prove that the points 'A, C_r B' ine on the same linė.

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64. Prove that the quadrilateral obtained by joining any two alternate vertices of a regular pentagon is cyclic.

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65. Construct a square of area 12 square centimetres.

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66. In the figure 'A B=A D' '/_ A=60^circ' '/_ C=150^circ' Show that the circle, centred at 'A' and radius 'A B'.

'(##VPU_TTT_MAT_X_P01_C02_E10_001_Q01##)'

a) Passes through the point D.

b) Passes through the point 'C'.

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67. Draw an equilateral triangle of sides 6 centimetres. Draw a square of the same area.

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68. In triangle ABC, $\angle A = 30^\circ$, $\angle B = 60^\circ$. If we draw a circle with AB as diameter, say

whether it passes through C? Why?

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69. In the figure, 'A B' is a diameter. 'P C' is perpendicular to 'A B . P C=6 cm, P B=' '3 cm'. Find the radius of the semi circle.

'(##VPU_TTT_MAT_X_P01_C02_E11_002_Q01##)'

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70. In the figure, '/_ ADC=/_ BCD'

Prove that '/_ A B C=/_ B C E .'

'(##VPU_TTT_MAT_X_P01_C02_E11_003_Q01##)'

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71. In the figure, 'O' is the centre of the circle. Central /_ of arc AXB is '60^circ' arc CYD is '80^circ'. Then find all the angles of 'triangle A P D'.

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72. In the figure, 'O' is the centre of the circle. If '/_ D=80^circ', find the following. meausrements.

'(##VPU_TTT_MAT_X_P01_C02_E11_005_Q01##)'

a) '/_ C'

b) '/_ ABC'

c) '/_ BAC'

d) '/_' F

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73. In the figure, 'O' is the centre. 'P Q' and 'RS',are perpendicular diameters of the circle. '(##VPU_TTT_MAT_X_P01_C02_E11_006_Q01##)' Radius is, '5 cm .' Chord. RE cuts 'P Q' at M. 'RE=8 cm'. Then find the lengths of SE, RM, ME.

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74. In the circle shown, the chords 'A Q' and BP passes through C.

a) The central /_ of arc 'A X B'.is '100^circ' Calculate '/_ Q'. The central angle of arc PYQ is

'60^circ .' Find all angles of the triangle 'B Q C'.

'(##VPU_TTT_MAT_X_P01_C02_E12_001_Q01##)'

b) In the picture, prove that '/_ APC' is half the sum of the central /_ of arc AXC and arc BYD:

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75. Draw a circle with radius 4 centimetres. Draw a triangle with two of its angles '65^circ' and '78^circ' and all vertices on the circle.

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76. In the figure, 'O' is the centre of the circle. and 'A, B, C, D' are points on it. '/_ E A B=' '120^circ, /_ EPD=100^circ .' Write the measures of '/_ EDB, /_ ECB' and '/_ D BC'.

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77. Draw a rectangle of length 4 centimetres, breadth 3 centimetres and square. of the same area.

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78. In the figure, the chord 'B D' is perpendicular to the diameter 'A C'. Find the measures of the following angles.

'(##VPU_TTT_MAT_X_P01_C02_E13_003_Q01##)'

a) '/_ BAC'

b) '/_ BCD'

c) '/_ A D C'

(d) '/_ CDM'

e) '/_ BAP'

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79. In the figure, 'O' is the centre of the circle.

'/_ A=60^circ'

'(##VPU_TTT_MAT_X_P01_C02_E14_001_Q01##)'

a) '/_ BOD=.....'

b) '/_ C=.....'

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80. Draw a circle of radius '3.5' centimetres. Draw a triangle of angles '50^circ, 60^circ,

70^circ' with its vertices as points on the circle.

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81. In the figure, 'C, D' are points on the circle AD is a diameter of the circle. '/_ C=30^circ, A B=4' centimetres.

'(##VPU_TTT_MAT_X_P01_C02_E14_003_Q01##)'

a) '/_ D=.....'

b) '/_ ABD=.....'

c) What is the length of the diameter?

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82. In the figure chords AB and CD intersect at P. PA = 8 centimetres, 'P B=6' centimetres, 'P C=4' centimetres, 'B C=4' centimetres.

'(##VPU_TTT_MAT_X_P01_C02_E14_004_Q01##)'

a) Which angle is equal to '/_ A' ?

b) Write one more pair of equal angles.

c) Find the length of 'PD'.

d) What is the length of AD?

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83. In the figure '/_ P=90^circ .' Sides of triangle APC are extended to 'B' and 'D'.

'(##VPU_TTT_MAT_X_P01_C02_E14_005_Q01##)'

a) If a circle is drawn with 'A C' as its diameter, where will be position of P with respect to that circle?

b) What about the position of 'P', if the circle is drawn with AD as diameter?

c) Prove that, the circles drawn with the sides of a qủadrilateral with perpendicular diagonals, will meet-at a common point.

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84. In the figure 'O' is the centre of the circle.

'/_ A O C=80^circ'

a) What is the measure of '/_ A B C ?'

b) What is the measure of '/_' ADC?

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85. A B' is the diameter of the circle. 'D' is a point on the circle. 'D' is a point on the circle.

'/_ ACB+/_ ADB+/_ AEB=270^circ', Measure of one among ACB, ADB, AEB is '110^circ'. Write the measure of '/_ A D B', '/_ ACB' and '/_ AEB .''(##VPU_TTT_MAT_X_P01_C02_E15_002_Q01##)'

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86. In the figure 'O' is centre and '/_ OAC=40^circ' '/_ OCB=30^circ'

'(##VPU_TTT_MAT_X_P01_C02_E16_001_Q01##)'

a) What is '/_ O C A' ?

b) What is '/_ AOC' ?

c) Find the measures of 3 angles of '/_\ ABC'.

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87. In the figùre, 'O' is centre of the circle and if

'/_ OCA=x'

'(##VPU_TTT_MAT_X_P01_C02_E16_002_Q01##)'

a) What is '/_ O A C ?'

b) Prove that '/_ O C A+/_ A B C=90^circ'.

c) Prove thait '/_ A D C-/_ O C A=90^circ'.

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88. In 'triangle A B C', circum radius is 6 centimetres, '/_ A=70^circ, /_ B=80^circ .' Construct the triangle.

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89. Draw the rectangle of length '5 cm' and breadth '3 cm'.

Draw the square of same area..

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