MATHS

BOOKS - V PUBLICATION

TANGENTS

Question Bank

---

1. In each of the two pictures below, a triangle is formed by a tangent to- a circle, the radius though the point of contact and a line

through the centre:

'(##VPU_TTT_MAT_X_P02_C07_E01_001_Q01##)'

'(##VPU_TTT_MAT_X_P02_C07_E01_001_Q02##)'

Draw thesein, your note book.

▶ **Watch Video Solution**

2. In the picture, all sides of a rhombus are fangents to a circle.

'(##VPU_TTT_MAT_X_P02_C07_E01_002_Q01##)'

Draw this picture. in your notebook.

▶ **Watch Video Solution**

3. Prove that the tangents drawn to a circle at the two ends of a diameter are parallel.

▶ **Watch Video Solution**

4. What sort of a quadrilateral is formed by the tangents at the ends of two perpendicular diameters of a circle?

▶ **Watch Video Solution**

5. P Q' is a tangent to the circle with centre 'O'.

'(##VPU_TTT_MAT_X_P02_C07_E02_001_Q01##)'

a) Find '/_ P'.

b) If '/_ O=42^circ', what is '/_ Q' ?

> ▶ **Watch Video Solution**

6. Draw the figure, using the given measurements.

'(##VPU_TTT_MAT_X_P02_C07_E02_002_Q01##)'

> ▶ **Watch Video Solution**

7. In the figure, 'A C' and 'B C' are tangents to the circle from 'C'. Centre of the circle 'O'.

i) Find '/_ A'.

ii) If. '/_ O', is 2 times '/_ C', then what is '/_ C' ?'(##VPU_TTT_MAT_X_P02_C07_E02_003_Q01##)'

> ▶ **Watch Video Solution**

8. Draw a circle of radius '2.5' centi-metres. Draw a triangle of angles '40^circ, 60^circ, 80^circ' with all its sides touching the circle.

9. In the picture, the small (blue) triangle is equilateral. The sides of the large (red) triangle are tangents to the circumcircle of the small triangleat its vertices.

'(##VPU_TTT_MAT_X_P02_C07_E03_002_Q01##)'

i) Prove that the large triangle is also equilateral and its sides.are double that of the small triangle.

ii) Draw-this picture, with sides. of the smaller triangle 3 centimetres.

10. The picture shown the tangents at two points on a circle and the radii through the points of the contact.

'(##VPU_TTT_MAT_X_P02_C07_E03_003_Q01##)'

i) Prove that the tangents have the same length.

ii) Prove that the line joining the ceritre and the points where the tangents meet bisects the angle between the radif.

'(##VPU_TTT_MAT_X_P02_C07_E03_003_Q02##)'

iii) Prove that this line is the perpendicular bisector of the chords joining the points of contact.

'(##VPU_TTT_MAT_X_P02_C07_E03_003_Q03##)'

▶ **Watch Video Solution**

11. Prove that the rilateral with sides as the tangents at the ends of a pair of perpendicular chords of a circle is ćyclic.

'(##VPU_TTT_MAT_X_P02_C07_E03_004_Q01##)'

What sort of a rilateral do we get if one chord

is a diameter?, And if both chords are diameters?

12. Cálculate the radius of the circle in which a tangent of length '12 cm' is drawn from a point at the distance '13 cm' from the center.

Draw rough figure.

Use Pythagoros theorem.

13. In the figure PA is a tangent and 'O' is the center of the circle. 'P A=17, /_' OPA '=30^circ' then calculate the radius of the circle and distance from centre to the point P.

Triangle OAP is a '30^circ, 60^circ, 90^circ' right triangle.

Using the property of this special right triangle find the radius and the distance OP.

'(##VPU_TTT_MAT_X_P02_C07_E04_002_Q01##)'

> ▶ **Watch Video Solution**

14. Radius of an incircle to a triangle is 3 centimetres. Draw the equilateral triangle.

15. The incircle of /_\' ABC touches the sides of the triangle at 'P, Q, R' as shown in the figure. Find all angles of '/_\ P Q R'.

'(##VPU_TTT_MAT_X_P02_C07_E04_004_Q01##)'

16. In the picture, the sides of the large triangle are tangents to the circumcircle of the small triangle, through its vertices.

'(##VPU_TTT_MAT_X_P02_C07_E05_001_Q01##)'

Calculate the angles of the large triangle.

> ▶ **Watch Video Solution**

17. In the picture, the sides of the large triangle are tangents of the circumcircle of the smaller triangle, through its vertices.

'(##VPU_TTT_MAT_X_P02_C07_E05_002_Q01##)'

Calculate the angles of the smaller triangle.

> ▶ **Watch Video Solution**

18. In the picture, PQ, RS, TU are tangents to the circuimcircle of '/_\ ABC'.

Sort out the equal angles in the picture.

'(##VPU_TTT_MAT_X_P02_C07_E05_003_Q01##)'

> ▶ **Watch Video Solution**

19. In the pleture, the tangent to the 'therefore' circumcircle of a regular pentagon through a verfex is shown.

Calculate the angle when the tangent makes with the two sides of the. pentagon through the point of contact:

'(##VPU_TTT_MAT_X_P02_C07_E05_004_Q01##)'

20. In the picture, a,triangle is förmed by two mutually perpendicular tangents to a circle and a third tangent.

'(##VPU_TTT_MAT_X_P02_C07_E06_001_Q01##)'

Prove that the perimeter of the triangle is equal to the diameter of the circle.

▶ **Watch Video Solution**

21. The picture shows a triangle formed by three tangents to a circle.

'(##VPU_TTT_MAT_X_P02_C07_E06_002_Q01##)'

Calculate the length of each tangent from the corner of the triangle to the point of contact.

22. In the pictúre, two circles touch at a point and the common tangent at this point is drawn.

'(##VPU_TTT_MAT_X_P02_C07_E06_003_Q01##)'

i) Prove that this tangent bisects another common tangent of these circles.

'(##VPU_TTT_MAT_X_P02_C07_E06_003_Q02##)'

ii) Prove that the points of contact of these two tangents form the vertices of a right triangle.

'(##VPU_TTT_MAT_X_P02_C07_E06_003_Q03##)'

iii) Draw the picture on the right in your notebook, using convenient lengths. What is special about the rilateral formed by joining the points of contact. of the circles?

'(##VPU_TTT_MAT_X_P02_C07_E06_003_Q03##)'

▶ Watch Video Solution

23. In the picture below, 'AB' is a diameter and 'P' is a point on 'AB' extended, 'A' tangent from 'P' touches the circle at 'Q'. What is the radius of the circle?.

'(##VPU_TTT_MAT_X_P02_C07_E06_004_Q01##)'

24. In the first picture below, the line joining: two points on a circle is extended by 4 centimetres and a tangent is drawn from this point. Its length is 6 centimetres, as shown:

'(##VPU_TTT_MAT_X_P02_C07_E06_005_Q01##)'

The second picture, shows the same line extended by 1 centimetre more and a tangent drawn.from this point. What is the length of this tangent?

25. Draw a circle of radius 3 centimetres.

a) Draw triangle, 'ABC' with this circle as circum circle and angles '50^circ, 60^circ' and '7.0^circ'

b) Construct triangle PQR, outside the circle,

by drawing tangents to the circle at the points 'A, B' and 'C'.

c) Find allangle of triangle PQR.

> ▶ **Watch Video Solution**

---

26. In the figure two circles are miutually passing through 'A' and 'B '. 'C D' is the common tangent to both circles.

Prove that '/_ C A D+/_ C B D=180^circ'.

'(##VPU_TTT_MAT_X_P02_C07_E07_002_Q01##)'

> ▶ **Watch Video Solution**

27. Radius of an incircle to a triangle is '3 cm'.

Two angles of this triangle are '55^circ' and

'63^circ'.

Draw this triangle.

28. In the figure, PA, 'PB' are tarigents through

'A' and 'B' of a circle with centre 'O'.

If the radius of the circle is 'r', then prove. that

'O P xx O Q=r^2'.

'(##VPU_TTT_MAT_X_P02_C07_E07_004_Q01##)'

> ▶ Watch Video Solution

---

29. In the figure, 'P Q' is a diameter and 'O^prime' is the centre of the circle.

'/_ R=/_ T=90^circ'

1) Prove that '/_ P S R=/_ O S Q'.

2) Prove that '/_\' PSR and '/_\' SQT are, similar.

'(##VPU_TTT_MAT_X_P02_C07_E07_005_Q01##)'

> ▶ Watch Video Solution

30. Draw a triangle of sides 4 centimetres, 5 centimetres, 6 centimetres and draw its incircle. Calculate ifs radius.

31. Draw à rhombus of sides5 centimeters and one angle. '50^circ' and draw its incircle.

32. Draw an equilateral triangle and a semicircle touching its two sides, as in the picture.

'(##VPU_TTT_MAT_X_P02_C07_E08_003_Q01##)'

▶ Watch Video Solution

33. What is the radius of the incircle of a right triangle having perpendicular sides of length 5 centimetres and 12 centimetres?

▶ Watch Video Solution

34. Prove that if the hypotenuse of a right triangle is 'h' and the radius of its incircle is 'r', then its area is 'r(h+r)'

▶ Watch Video Solution

35. Prove the radius of the Incircle of an equilateral triangle is half the radius of its circumclrcle.

▶ Watch Video Solution

36. a) Draw triangle 'A B C' with 'A B=10 cm', '/_ A=50^circ' and '/_ B^prime=70^circ'.

b) Draw the incircle of triangle 'ABC' and write the measure of its radius.

> ▶ **Watch Video Solution**

37. In the figure 'P' is at a distance of '6 ~cm' from the centre of the circle. PA and 'P B' are tangents from the point 'P'. Find the radius of the circle and length of tangents.

'(##VPU_TTT_MAT_X_P02_C07_E09_002_Q01##)'

38.

(##VPU_TTT_MAT_X_P02_C07_E09_003_Q01##)'

In the figure, the radius of the smaller circle is 3 centimetres, that of the bigger circle is 6 centimetres and the distance between the centres of the circles is 15 centimetres. 'P Q' is a tangent to both the circles. Find ts length.

39.

(##VPU_TTT_MAT_X_P02_C07_E09_004_Q01##)'

In the figure 'O' is the centre of the circle 'A B' and 'A C' are tangents. If '/_ B A C=80^circ', find out '/_ BOC' and '/_ BPC' :

▶ **Watch Video Solution**

40.

(##VPU_TTT_MAT_X_P02_C07_E09_005_Q01##)'

In the figure 'MN=12 cm, MD=8 cm' and 'M B=9

cm .' In the figure, what is equal to 'M A times M B'. Find 'C D' and 'A B'.

> ▶ **Watch Video Solution**

41.

(##VPU_TTT_MAT_X_P02_C07_E10_001_Q01##)'
In the figure 'O' is the centre of the circle. 'C' is a point on the semicircle with diameter OA. BC is the tangent at 'B' if. 'O B=1 cm, AB=3 cm', what is 'BC' ? Write the measures of the angles of /_\ OBC' ?

42. In the figure, a tangent at a vertex is drawn to the circumcircle of the regular hexagon. What is the angle between the tangent and the point of tangency of the side of the hexagon?

'(##VPU_TTT_MAT_X_P02_C07_E10_002_Q01##)'

43. In the figure, tangent through the point A touches the circle, at B. Diameter through B cut the circle at C. The line AC passes through the circle at the point 'P'. Tangent through 'P' meet 'A B' at M. Prove that 'M' is the midpoint of 'A B'.

'(##VPU_TTT_MAT_X_P02_C07_E10_003_Q01##)'

44. Two circles with centres 'A' and B have radii '8 cm' and '3 cm' respectively. 'PQ' is the tangënt to both circles.Distance between 'A' and 'B' is 13 centimetres. What is the length of PQ?

> ▶ **Watch Video Solution**

45.

(##VPU_TTT_MAT_X_P02_C07_E10_005_Q01##)'

Two circles with radii 'dotR' and 'r' intersect. at.

a point. If 'P Q' is the tangent to the circles.

Prove that 'P Q=2 sqrt(Rr)'

46.

(##VPU_TTT_MAT_X_P02_C07_E10_006_Q01##)'

In the figure two circles intersect at P. Two lines through 'P' intersect the circle at 'A, B, C' and 'D'. Prove that 'A B' is parallel to 'CD'.

47. Two circles joinedat 'C'. Chord AB of the large circle touches the small circle at M. Radius of the small circle is,r and of the large circle is 'R'. If 'M A=M B=a', prove that $'a^2=4 r(R-r)'$.

'(##VPU_TTT_MAT_X_P02_C07_E10_007_Q01##)'

▶ **Watch Video Solution**

48. Draw a circle of radius 3 centimetres. Mark a point P at a distance 6 centimetres from the

centre of the circle. Draw tangents from P to the circle.

49. In the figure chord 'B C' is extended tò 'P'. Tangent from 'P' to the circle is PA. AQ is the bisector of '/_ BAC'.

'(##VPU_TTT_MAT_X_P02_C07_E11_002_Q01##)'

a) Write one pair of equal angles from the figure.

b) If '/_ PAC=x' and '/_ PCA=y' prove that '/_

BAC=y-x'

c) Prove that '/_ PAQ=(y+x)/2'.

50. In the figure 'C' is the centre of the circle, 'P A' and 'P B' are tangents. 'P C=5' centimetres and radius of the circle is 3 centimetres.

'(##VPU_TTT_MAT_X_P02_C07_E12_001_Q01##)'

a) Find the length of PA.

b) What is the area of the rilateral PACB?

51. Draw a circle of radius 3 centimetres. Mark a point 7 centimetres away from its centre. Draw the tangents to the circle from that point.

52. In the figure, the circle with centre O is the excircle of the right triangle 'A C B' and 'P, Q, R' are the points where the circle touches the sides of the triangle. 'A C=8 cm, C R=4, cm, BR=2

cm'

'(##VPU_TTT_MAT_X_P02_C07_E13_001_Q01##)'

a) What is the length of 'A Q ?'

b) What. is the perimeter of the triarigle ACB?

c) What is, the area of the triangle ACB?

d) What is the radius of the incircle of the triangle ACB?

▶ Watch Video Solution

53. Draw a circle with radius '2.5 cm'. Draw a triangle of two angles 50,60 with all its aides

touching the circle.

54. if length of the chord 'AB' is 18 centimetres. The chord is extended to 'P' and the tangents drawn from that point, have length 12 centimetres. Find thé length of BP.

55. AP is the tangent to the circle with centre at 'O' and radius 4 centimetres. 'A B' '=3 cm'. Find the length of OA and the length of the tangent AP.

56. Calculate the area and perimeter of a triangle of sides 30 centimetre, 28 centimetre and 30 centimetre. Also calculate the radius of the incircle.

57. In the figure, AC is a tangent to the circle with centre O . More over, 'B C' is the perpendicular from 'C' to OA. If the radius of the circle be 'r', prove that 'OA xx OB=r^2'. '(##VPU_TTT_MAT_X_P02_C07_E15_001_Q01##)'

▶ **Watch Video Solution**

58. In the fiqure, 'P' is the centre of the excircle of triangle 'ABC'.

'(##VPU_TTT_MAT_X_P02_C07_E15_002_Q01##)'

If '/_ A B C=40^circ, /_ B A C=80^circ ,' find the angles of triangle 'A P C'.

> ▶ **Watch Video Solution**

---

59. Draw a triangle with measures '50^circ, 60^circ', and '70^circ' and inner. radius 3 centimetres.

> ▶ **Watch Video Solution**

60. In the figure, OA is a radius and PA is.the tangent to the circle at 'A'. If 'O P=5 cm', 'O A=3 cm', then

'(##VPU_TTT_MAT_X_P02_C07_E16_001_Q01##)'

a) What is the measure of '/_' OAP?

b) Calculate the length of the tangent PA?

▶ **Watch Video Solution**

61. In the figure, 'PA, PB' are two tangents to the circle with centre 'O'.

'(##VPU_TTT_MAT_X_P02_C07_E16_002_Q01##)'

If '/_ PAB=50^circ', Write the measures of '/_ AQB, /_ AOB, /_ APB^circ'

62. In the figure, PT, PS are tangents to the large circle and small circle respectively. The circle cut each,other at points 'A' and B. If 'PB=4 cm, AB=5 cm'

'(##VPU_TTT_MAT_X_P02_C07_E16_003_Q01##)'

a) Find the length of PA.

b) Calculate the lengths of PS ànd PT.