RS Aggarwal Solutions for Class 10 Maths Chapter 12 Exercise 12.1: The Physics Wallah academic team has produced a comprehensive answer for Chapter 12 Circles in the RS Aggarwal class 10 textbook. Use Physics Wallah NCERT Solutions to answer class 10 maths questions from the NCERT textbook.

The RS Aggarwal class 10 solution for chapter-12 Circles Exercise-12A is uploaded for reference only; do not copy the solutions. Before going through the solution of chapter 12 Circles Exercise-12A, one must have a clear understanding of the chapter 12 Circles. Read the theory of chapter 12 Circles and then try to solve all numerical of exercise-12A.

RS Aggarwal Solutions for Class 10 Maths Chapter 12 Exercise 12.1 Overview

RS Aggarwal Solutions for Class 10 Maths Chapter 12 Exercise 12.1, which focuses on "Circles," provide step-by-step answers to problems related to the properties and theorems of circles. This exercise typically covers topics such as the angle subtended by a chord at the center, the relationship between the angles in a circle, and the properties of tangents.

The solutions help students understand these concepts clearly by breaking down complex problems into manageable steps, offering a solid foundation in circle geometry. Using these solutions, students can effectively practice and master the key concepts required for exams.

What are Circles?

A circle in mathematics or geometry is a particular sort of ellipse when the two foci coincide and the eccentricity is zero. Another way to describe a circle is as the locus of the points drawn equally apart from the centre. The radius of a circle is the distance between its centre and its outer line. In addition to being equal to twice the radius, the diameter is the line that splits a circle in half.

A circle's radius is used to measure this fundamental 2D form. The plane is divided into internal and exterior parts by the circles. That is comparable to that kind of line segment. Consider that the line segment is bent till the ends come together. Until the loop is exactly round, arrange it as desired.

A two-dimensional figure with an area and perimeter is a circle. The circumference, or the distance around the circle, is another name for the perimeter. The region enclosed by a circle in a two-dimensional plane is its area. Let's go over the definition of circles, formulae, and key words in depth with examples.

RS Aggarwal Solutions for Class 10 Maths Chapter 12 Exercise 12.1

Below we have provided RS Aggarwal Solutions for Class 10 Maths Chapter 12 Exercise 12.1 for the ease of the students –

Q. A point P is at a distance of 29 cm from the centre of a circle of radius 20 cm. Find the length of the tangent drawn from P to the circle.

Solution

As we know tangents and radius are at an angle of 90°
hence we ccan say PO is the hypotenous of the right angle triangle APO
where A is point of contact

so
applying pythagoras theoram

$Po^2 = OA^2 + AP^2$
$29^2 = 20^2 + AP^2$
so
$AP = \sqrt{441}$

$AP = 21CM = length\ o\ \ tangent$

Q. A point P is 25 cm away from the centre of a circle and the length of tangent drawn from P to the circle is 24 cm. Find the radius of the circle.

Solution

By Pythagoras theorem,

$OP^2 = PQ^2 + OQ^2 (Q\ is\ point\ on\ circle)$
$25^2 = 24^2 + OQ^2$
$OQ^2 = 49$
$OQ = 7\,CM$

OP = 7

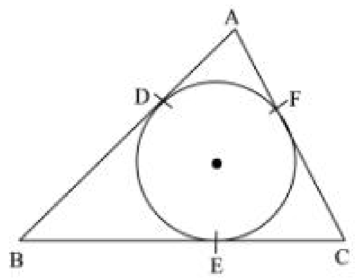
The radius of the circle will be 7cm.

Q. Two concertric circles are of radii 6.5 cm and 2.5cm. Find the length of the chord of the larger circle which touches the smaller circle.

Solution

Let the two concentric circles with centre O.
AB be the chord of the larger circle which touches the smaller circle at point P
∴ AB is tangent to the smaller circle to the point P.
$\Rightarrow OP \perp AB$
By Pythagoras theorem in Δ OPA,
$OA^2 = AP^2 + OP^2$
$\Rightarrow 6.5^2 = AP^2 + 2.5^2$
$\Rightarrow AP^2 = 42.25 - 6.25$
$\Rightarrow AP = 6$
In Δ OPB,
Since OP ⊥ AB,
AP = PB (∵ Perpendicular from the centre of the circle bisects the chord)
AB = 2AP = 2 × 6 = 12 cm
∴ The length of the chord of the larger circle is 12 cm.

Q. 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 fo AD, BE and CF.



Let AD = x, so, BD = 12 - z

BE =x, so, EC = 8-x

CF = y, so Af = 10 -y

BD = BE

CE = CF

AD = AF

ie, 12-z = x

= x + z = 12 1

8-x = y

=y+x = 8 2

10-y = z

z + y = 10 3

Adding x, y and z

x + y + z = 12 -z + 8- x +10 -y

= 2(x+ y + z) = 30

x + y + z = 15 4

Now subtract 1 from 4

x + y+ z - (x + z) = 15-12

y = CF = 3

Subtract 2 from 4

x + +y +z - (y+x) = 15-8

z = AD = 7

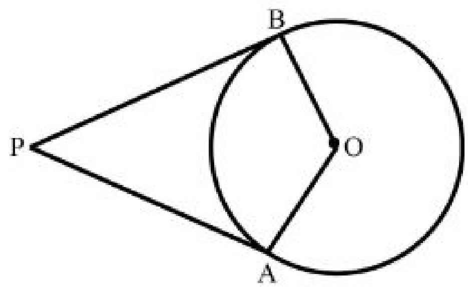
Subtract 3 from 4

x + y+ z -(z +y) = 15 - 10

x = BE = 5

Therfore, AD = 7, BE = 5 and CF = 3

Q. In the given figure, PA and PB are the tangent segments to a circle with centre O. Show that the points A, O, B and P are concyclic.



Solution

As we know that the tangents drawn from an external point are perpendicular to the radius at the point of contact.

So, $OA \perp AP$ and $OB \perp PB$

$\Rightarrow \angle OAP = 90^\circ$ and $\angle OBP = 90^\circ$

Since, OAPB form a quadrilateral,

so sum of its internal angles equals to 360°

$\angle A + \angle B + \angle O + \angle P = 360^\circ$

$\Rightarrow 90 + 90 + \angle O + \angle P = 360$

[Since, $\angle OAP = \angle A = 90^\circ$ and $\angle B = \angle OBP = 90^\circ$]

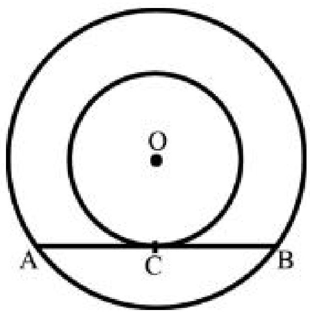
$\Rightarrow \angle O + \angle P = 360 - 180$

$\therefore \angle O + \angle P = 180^\circ$

Thus, the sum of opposite angles of a quadrilateral is 180°.

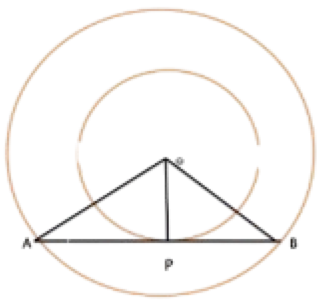
Hence, A, O, B and P are concyclic.

Q. In the given figure, the chord AB of the larget of the two concentric circles, with centre O, touches the smaller circle at C. Prove that AC = CB.



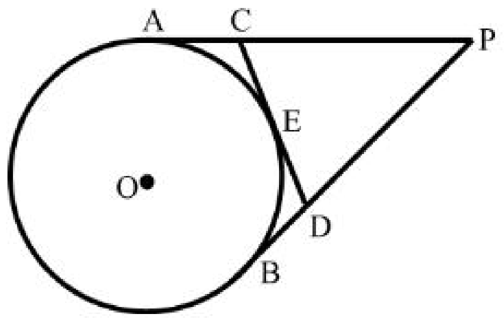
Solution

Here is the solution for your question
name are different to that of your question



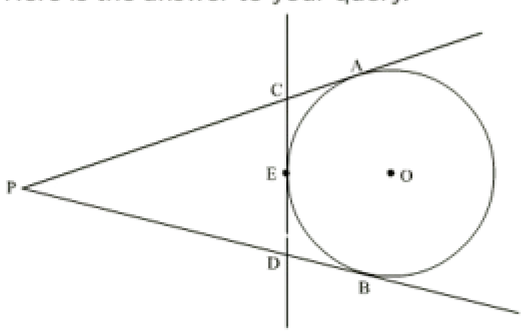
Let there is a circle having center O
Let AB is the tangent to the smaller circle and chord to the larger circle.
Let P is the point of contact.
Now, draw a perpendicular OP to AB
Now, since AB is the tangent to the smaller circle,
So, ∠OPA = 90
Now, AB is the chord of the larger circle and OP is perpendicular to AB.
Since the perpendicular drawn from the center of the circle to the chord bisect it.
So, AP = PB
Hence, in two concentric circles, the chord of the larger circle which touches the smaller circle is bisected at the point of contact

Q. From an external point P, tangents PA and PB are drawn to a circle with centre O. If CD is the tangent to the circle at a point E and PA = 14 cm, find the perimeter of Δ PCD.



Solution

Here is the answer to your query.



Given :PA and PB are tangent to the circle with centre O. CD is a tangent to the circle at E which intersects PA and PB in C and D respectively and PA = 14 cm.

We know that lengths of lengths drawn from as extend point to a circle are equal

∴ PA = PB = 14 cm

CA = CE

DB = DE

Now perimeter of ΔPCD = PC + CD + PD

= PC + (CE + ED) + PD

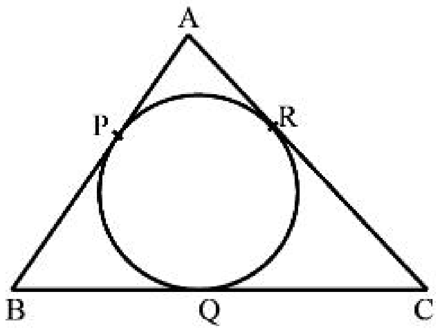
= PC + (CA + DB) + PD

= (PC + CA) + (DB + PD)

= PA + PB

= 14 cm + 14 cm = 28 cm

Q. A circle is inscribed in a Δ ABC touching AB, BC and AC at P, Q and R respectively. If AB = 10 cm, AR = 7 cm and CR = 5 cm, find the length of BC.



Solution

A circle is inscribed in a triangle ABC touching AB, BC and CA at P, Q and R respectively.

Class 10 RS Aggarwal Solutions Chapter 12 Circles ex 12

Also, AB = 10 cm, AR = 7cm, CR = 5cm

AR, AP are the tangents to the circle

AP = AR = 7cm

AB = 10 cm

BP = AB - AP = (10 - 7) = 3 cm

Also, BP and BQ are tangents to the circle

BP = BQ = 3 cm

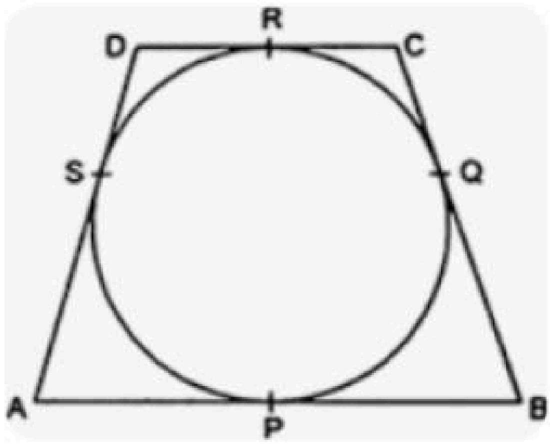
Further, CQ and CR are tangents to the circle

CQ = CR = 5cm

BC = BQ + CQ = (3 + 5) cm = 8 cm

Hence, BC = 8 cm

Q. In the given figure, a circle touches all the four sides of a quadrilateral ABCD whose three sides are AB = 6 cm, BC = 7 cm and CD = 4 cm. Find AD.



Solution

Let the circle touches the sides AB, BC, CD and DA at P, Q, R, S respectively

We know that the length of tangents drawn from an exterior point to a circle are equal

Given,

AB = 6 cm, BC = 7 cm, CD = 4 cm, CD = 4 cm

AP = AS —-(1) {tangents from A}

BP = BQ —(2) {tangents from B}

CR = CQ —(3) {tangents from C}

DR = DS—-(4) {tangents from D}

Adding (1), (2) and (3) we get

∴ AP + BP + CR + DR = AS + BQ + CQ + DS

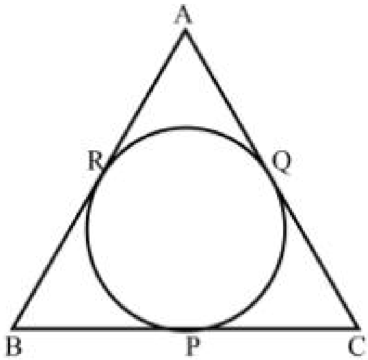
⇒ (AP + BP) + (CR + DR) = (AS + DS) + (BQ + CQ)

⇒ AB + CD = AD + BC

⇒ AD = (AB + CD) – BC = {(6 + 4) – 7} cm = 3 cm

Hence, AD = 3 cm

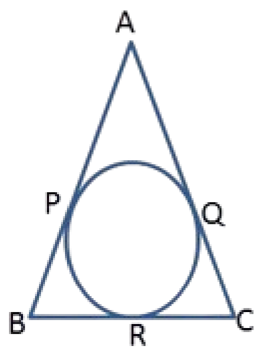
Q. In the given figure, an isosceles triangle ABC, with AB = AC, circumscribes a circle. Prove that the point of contact P bisects the base BC.



Solution

is the answer to your question

points name are slightly changed



The tangents drawn from an externel point to a circle are equal in length.

– AQ .... (1)

BP = BR (2)

CQ = CR .... (3)

Given that ABC is an isosceles triangle with AB = AC.

Subtract AP on both sides, we obtain

AB AP = AC – AP

⇒ AB – AP = AC – AQ (from (1))

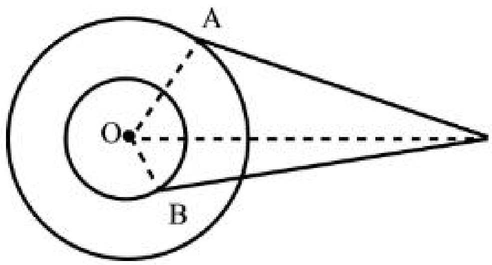
∴ BP = CQ.

⇒ BR = CQ (from (2))

CR (from (3))

R = CR, it shows that BC is bisected at the point of contact R

Q. In the given figure, O is the centre of two concentric circles of radii 4 cm and 6 cm respectively. PA and PB are tangents to the outer and inner circle respectively. If PA = 10 cm, find the length of PB up to one place of decimal.



Solution

Given O is the centre of two concentric circles of radii 4 cm and 6 cm respectively. PA and PB are tangents to the outer and inner circle respectively. PA = 10cm. Join OA, OB and OP.

Then, OB = 4 cm, OA= 6 cm and PA = 10 cm

Class 10 Maths RS Aggarwal Solutions Chapter 12 Circles ex 12

In triangle OAP,

Maths RS Aggarwal Class 10 Solutions Chapter 12 Circles ex 12

$OP^2 = OA^2 + PA^2$

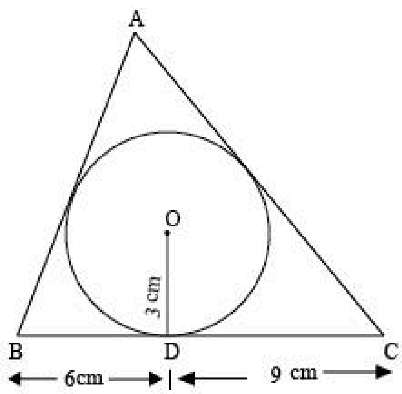
$= 6^2 + 10^2 = 136$

in ΔOBP

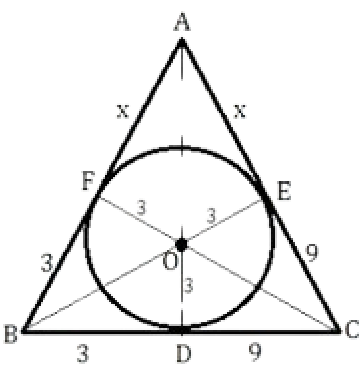
$BP = \sqrt{OP^2 - OB^2} = \sqrt{136 - 16} = \sqrt{120} = 10.9\ cm$

Hence, BP = 10.9 cm

Q. In the given figure, a triangel ABC is drawn to circumscribe a circle of radius 3 cm such tha the segments BD and DC into which BC is divided by the point o f contant D, are of lengths 6 cm and 9 cm respectively. If the area of Δ = 54 cm^2 then find the lengths of sides AB and AC.



Solution



Consider the above figure. We assume that the circle touches AB in F, BC in D and AC in E. Also given is BD = 9cm and DC = 3cm.Let AF = x.

For ΔABC, AF = AE = x (∵ tangents drawn from an external point to a circle are congruent i.e. AE and AF are tangent drawn from external point A.)

Similarly we have, BE = BD = 3cm (∵ congruent tangents from point B)

And CF = CD = 9cm (∵ congruent tangents from point C)

Now, AB = AE + EB = x + 3

BC = BD + DC = 12

AC = AF + FC = x + 9

Then,

2s = AB + BC +CA = x + 3 + 12 + 1 + x + 9 = 2x + 24

∴ s = x + 12

Using Heron's formula,

Area of ΔABC = $\sqrt{s(s-a)(s-b)(s-c)}$

= $\sqrt{(12+x)(12+x-12)(12+x-x-9)(12+x-x-3)}$

= $\sqrt{(12+x)(x)(3)(9)}$

= $\sqrt{27(12x+x^2)}$

= $3\sqrt{3(12x+x^2)}$ -----(1)

Area of ΔOBC = $\frac{1}{2} \times 12 \times 3 = 18$

Area of ΔOAB = $\frac{1}{2} \times (3+x) \times 3 = \frac{9+3x}{2}$

Area of ΔOAC = $\frac{1}{2} \times (9+x) \times 3 = \frac{27+3x}{2}$

Total Area = Area of ΔOBC + Area of ΔOAB + Area of ΔOAC

: $8 + \frac{9+3x}{2} + \frac{27+3x}{2}$

$\Rightarrow 3\sqrt{3(12x+x^2)} = 8 + \frac{9+3x}{2} + \frac{27+3x}{2}$

$\Rightarrow 3\sqrt{3(12x+x^2)} = \frac{36+9+3x+27+3x}{2}$

$\Rightarrow 3\sqrt{3(12x+x^2)} = \frac{72+6x}{2} = 12 + x$

Squaring both sides,

$\Rightarrow [\sqrt{3(12x+x^2)}]^2 = (12+x)^2$

$\Rightarrow 3(12x+x^2) = (12+x)^2$

$\Rightarrow 36x + 3x^2 = 144 + 24x + x^2$

$\Rightarrow 2x^2 + 12x - 144 = 0$

$\Rightarrow x^2 + 6x - 72 = 0$

$\Rightarrow (x+12)(x-6) = 0$

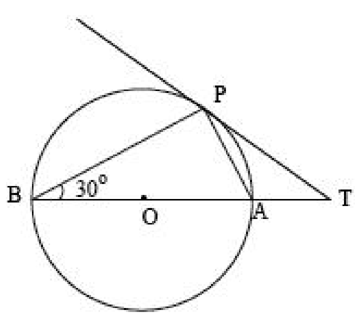
$\Rightarrow$ (x = 6

Hence AB = x + 3 = 9 + 3 = 12 cm

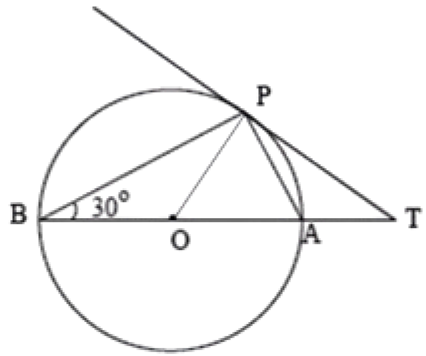
BC = 12 cm

AC = x + 9 = 15 cm

Q. In the given figure, O is center of the circle and TP is the tangent to the circle from an external point T. If ∠PBT = 30°, prove that BA : AT = 2 : 1.



Solution



Construction: Join OP.

Proof: AB is the chord passing through the center.

So, AB is the diameter.

Since, angle in a semicircle is a right angle.

∴ $\angle APB = 90^\circ$

By using alternate segment theorem, we have

We have, $\angle ABP = \angle PAT = 30^\circ$

In triangle BOP, we have

OB = OP (Radius)

$\angle PBO = \angle OPB = 30^\circ$ [Angles opposite to equal sides are equal]

⇒ $\angle APB = 90^\circ$

⇒ $\angle OPB + \angle OPA = 90^\circ$

⇒ $\angle OPA = 90 - 30^\circ = 60^\circ$

Benefits of RS Aggarwal Solutions for Class 10 Maths Chapter 12 Exercise 12.1

RS Aggarwal Solutions for Class 10 Maths Chapter 12 Exercise 12.1 on "Circles" offer several benefits for students studying geometry. Here are some key advantages:

1. **Clear Understanding of Concepts**

Step-by-Step Solutions: Each problem is solved with detailed, step-by-step explanations, making it easier for students to follow and understand the underlying concepts of circles.

Concept Reinforcement: The solutions help reinforce the theoretical aspects of circle geometry, such as the properties of angles, chords, and tangents.

2. **Improved Problem-Solving Skills**

Practice and Application: By working through these solutions, students practice applying geometric theorems and properties to solve problems, improving their problem-solving skills.

Varied Problem Types: The exercise covers a range of problem types, helping students learn how to approach different kinds of questions related to circles.

3. **Enhanced Exam Preparation**

Familiarization with Exam Format: The solutions help students get familiar with the format and types of questions that might appear on exams.

Confidence Building: Regular practice with these solutions boosts students' confidence in handling similar problems during exams.

4. **Efficient Learning**

Time Management: By providing direct answers and methods, the solutions help students learn to manage their time more effectively during tests.

Focused Learning: Students can focus on specific areas where they may need additional practice, as the solutions highlight key concepts and problem-solving techniques.

5. **Self-Learning and Revision**

Independent Study: The solutions enable students to study independently and verify their answers, fostering self-learning and self-assessment.

Revision Aid: They serve as a useful resource for revising the chapter, helping students review important concepts and techniques.