What is the Point of contact?

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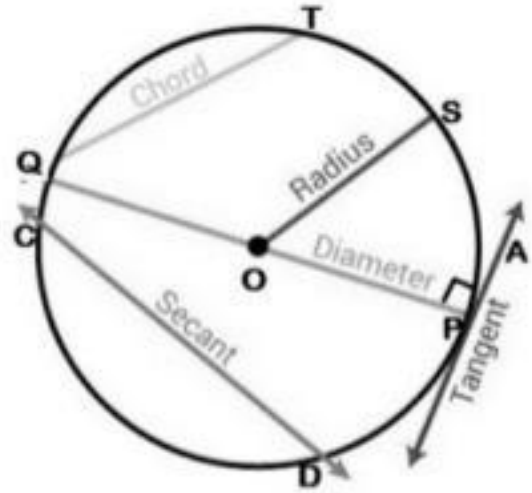
TANGENTS AND SECANTS TO A CIRCLE

Tangent: A tangent to a circle is a line which touches the circle exactly at one point. The point which is common to the line and the circle is called **point of contact.**
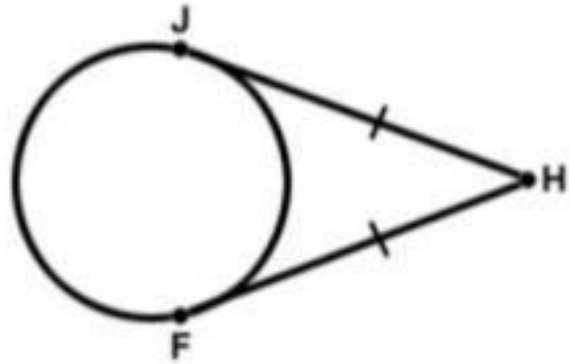
Secant: A line which intersect a circle in two distinct points.

In the given figure,

1. Tangent(AP) at any point of a circle (P) is perpendicular to the radius through the point of contact.
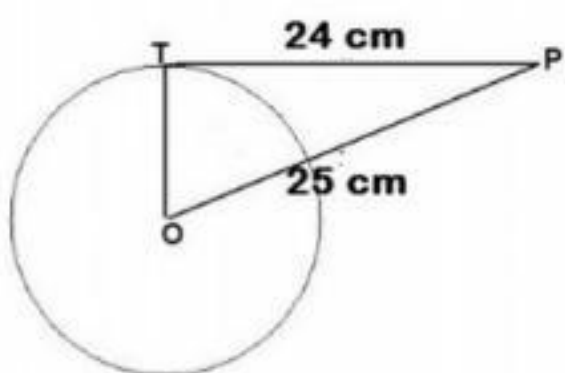i.e., OP⊥AP.
2. The lengths of the two tangents from the external point to a circle are equal.

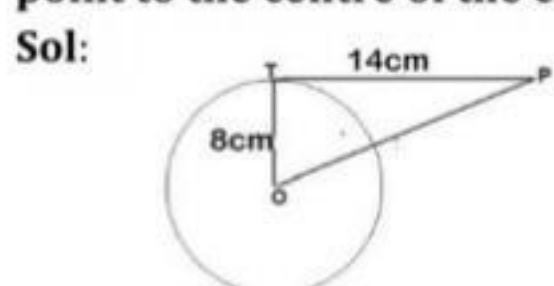In the given figure HJ and HF are tangents which are equal. HJ = HF.

1 MARK QUESTIONS

1. A point 25 cm away from the centre O of the circle. The length of the tangent drawn from P to the circle is 24cm. Find the radius of the circle.

Sol: Let P be the point which is 25 cm away from the centre. Length of the tangent from a point to the circle 24cm. OT is the radius.
In Δ OPT, $OP^2 = OT^2 + TP^2$
(∵Pythagorous theorem)
In Δ OBP, $OT^2 = OP^2 - TP^2$
$\Rightarrow OT = \sqrt{OP^2 - TP^2}$
$\Rightarrow OT = \sqrt{25^2 - 24^2}$
$\Rightarrow OT = \sqrt{625 - 576} = \sqrt{49} = 7cm.$

2. The length of tangent from an external point is 14 cm and radius of a circle is 8cm. Find the length from the external point to the centre of the circle?
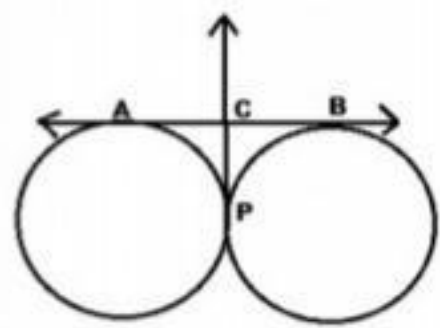**Sol:**

The length of tangent from an external point PT = 14 cm,
radius of a circle r = 5cm
OP=?
InΔ OPT, $OP^2 = OT^2 + TP^2$
(∵Pythagoras theorem)
$\Rightarrow OP^2 = 8^2 + 14^2$
$\Rightarrow OP = \sqrt{64 + 196} = \sqrt{260} = 2\sqrt{65}$
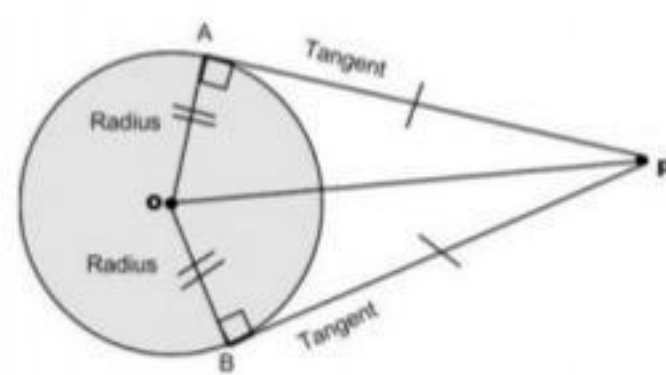∴ OP = 2 × 8.06 = 16.12 cm.

10th Class Special

3. In the given figure if BC = 3 cm, find the length of AB?

Sol: Given BC = 3cm, BC = CP = 3cm (length of tangents from external point are equal) AC = CP = 3 cm (length of tangents from external point are equal)
AB = AC + CB = 3 + 3 = 6cm.

4. The lengths of tangents drawn from an external point to a circle are equal.

Given: Circle with centre 'O' P is an external point, PA and PB are tangents
Required to prove: PA = PB
Construction: Join OA, OB and OP
Proof: In Δ OPA, $OP^2 = OA^2 + AP^2$ –(i)
(∵Pythagorous theorem)
In Δ OBP, $OP^2 = OB^2 + PB^2$ _____(ii)
(∵Pythagorous theorem)
from (i) and (ii) $OA^2 + AP^2 = OB^2 + PB^2$
(∵OA =OB = radius) $PA^2 = PB^2 \Rightarrow PA = PB$

5. Length of the minute hand of a clock is 7 cm. Find the area covered by the minute hand in 20 minutes?
Sol: Angle described by minute hand is 20 minutes $= \frac{360°}{60°} \times 20 = 120°$
Area covered by the minute hand 20 minutes $\frac{120°}{360°} \times \frac{22}{7} \times 7 \times 7 = 51.33$ cm²

6. The radius of a circle is 8 cm, and the length of an arc is 24 cm. Find the area of the sector?
Sol: Area of the sector $= \frac{1}{2} \times$ (length of the corresponding arc × radius)
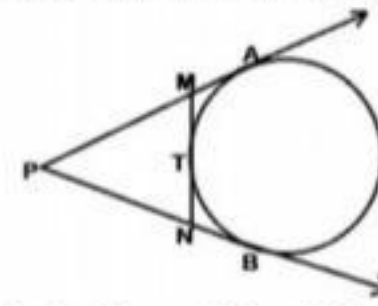$= \frac{1}{2} \times 24 \times 8 = 96cm$

7. What is the length of the tangent drawn from a point 10cm away from the centre of a circle of radius 8cm.
Sol: Length of the tangent $l = \sqrt{d^2 - r^2}$
$= \sqrt{10^2 - 8^2} = \sqrt{100 - 64} = \sqrt{36}$
= 6 cm.

2 MARK QUESTIONS

**1.** In the given figure PA, PB and MN

are tangents to a circle and PA = 6cm. Find the perimeter of a triangle PMN.

Sol: Given PA = PB = 6cm
(∵ tangents drawn from an external point to a circle are equal)
MA = MT, NB = NT
(∵ tangents drawn from an external points are equal),
perimeter of a ΔPMN = PM + MN + NP
= PM + MT + TN + NP
= PM + MA + NB + NP = PA + PB
= 6 + 6 = 12cm
∴perimeter of a ΔPMN = 12 cm.

2. Prove that the tangents to a circle at the end points of a diameter are parallel.
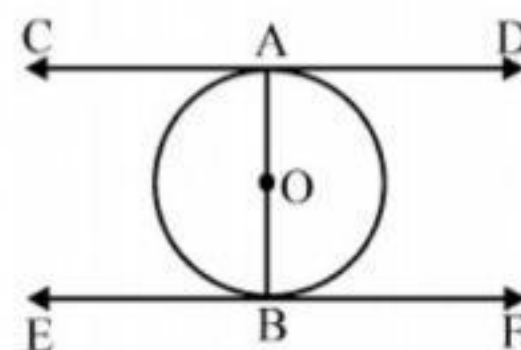
Sol: OA, is radius, CAD is tangent <CAO = 90° (angle between the radius and tangent) similarly OB is radius, EBF is tangent <FBO = 90° (angle between the radius and tangent)
But ∠CAO =∠FBO are alternate angles
∴ CD//EF

**3.** In a given figure PA and PB are tangents from a point P to the circle with centre O. Prove that AOBP is a cyclic quadrilateral.
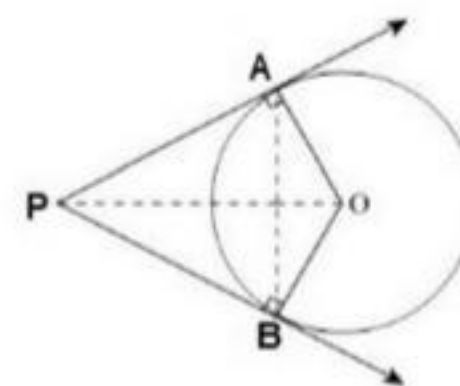
Sol: <OAP = 90° and <OBP = 90°
(∵ tangent to a circle is perpendicular to the radius through the point of contact)
<OAP +<OBP = 90° +90° = 180°
(∵ one pair of opposite angle of quadrilateral AOBP are supplementary)
∴AOBP is a cyclic quadrilateral.

4 MARK QUESTIONS

1. Draw a circle of radius 3cm. From a point 8 cm away from its centre, construct the pair of tangents to the circle and measure their lengths.
Verify using Pythagoras theorem.
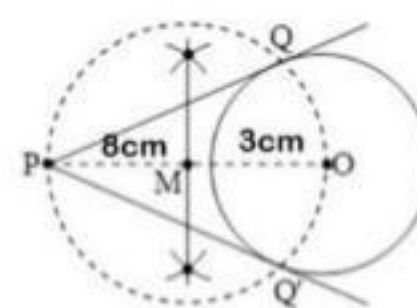
Construction steps:
1. Draw a circle of radius 3cm, with centre 'O'
2. Mark point P, 8cm away from the centre.

3. Join OP and draw the perpendicular bisector of OP which intersect at M
4. Draw a circle with centre M, with radius MP =MO, these circle interest previous circle at Q and Q/.
5. Join PQ and PQ/ we get required tangents.

2. Draw a line segment AB of length 10cm. Taking A as centre, draw a circle of radius 4cm and taking B as centre another circle of radius 3cm. Construct tangent to each circle from the centre of the other circle.
Sol
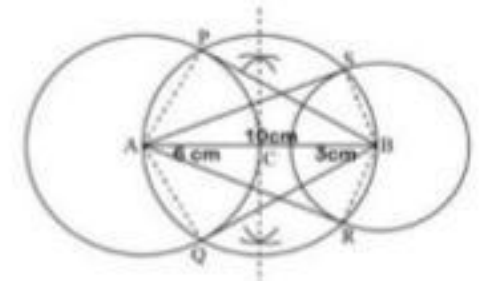
Construction steps:
1. Draw line segment of AB =10cm, taking A and B as centre draw two circles of radius 6cm and 3cm respectively.
2. Bisect AB and let C be midpoint.
3. Taking C as centre and AC = BC as a radius. draw a circle such that it intersects P, Q, R and S respectively
4. Join BP, BQ, AS and AR.
Thus BP, BQ AS and AR are the required tangents.

3. Construct tangents to a circle of radius 5 cm from a point on the concentric circle of radius 7 cm and measure its length. Also verify the measurement by actual calculation.
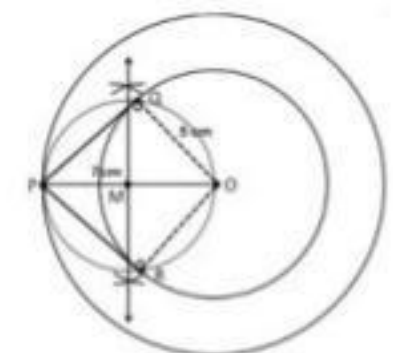
Construction steps:
1. Draw a circle of radius 5cm with centre O.
2. Draw concentric circle of radius 6cm, with centre O.
3. Mark point P on the large circle, join OP. make a perpendicular bisector of OP. Let M be the midpoint PO.
4. Taking M as centre and MO as radius draw a circle. It intersect the smaller circle at the points Q and R.
5. Join PQ and PR. ∴PQ and PR are the required tangents. After measuring the lengths of tangents PQ and PR we have PQ = PR = 4.9 cm.
Verification: In Δ PQO, $PO^2 = PQ^2 + QO^2$
(∵Pythagoras theorem)
$7^2 = PQ^2 + 5^2 \Rightarrow PQ = \sqrt{49 - 25}$
$= \sqrt{24} = 4.9$ cm ⟶ ∴ PQ = PR = 4.9 cm.

What are Waste lands?

CURRENT AFFAIRS

1. Arise is in news in recent times, what is it?
A) It is India's first indigenously designed satellite, using solar power prepared by IIT (Madras)
B) It is India's first indigenously designed Wind power project, can be used in desert areas
C) It is India's first indigenously' designed standing wheelchair, prepared by IIT (Madras)
D) None

2. Assertion: MSTC Ltd has signed an agreement with Allahabad Bank
Reason: Both organizations, wants to sell NPAs through e-Auction
A) Both A and R are true and R is the correct explanation of A
B) Both A and R are true but R is not the correct explanation of A
C) A is true but R is false
D) A is false but R is true

3. Union Agriculture Minister Narendra Singh Tomar has recently released the 5th edition of Wastelands Atlas 2019, what are Waste lands?
A) Wastelands are those, which are near by to the coastal regions
B) These are the lands, which are productive either in kharif or in Rabi, but not both
C) Barren and uncultivated land lying unproductive or which is not being utilized to its potential
D) None

4. Assertion: Government vehicles, which are over 15-years-old have been banned across Bihar, while commercial vehicles of the same age will be stopped from plying in Patna and adjacent regions
Reason: Private vehicle older than 15 years will be allowed to ply if they pass a pollution test
A) Both A and R are true and R is the correct explanation of A
B) Both A and R are true but R is not the correct explanation of A
C) A is true but R is false
D) A is false but R is true

5. Observe the following?
1. Second 'No money for terror' conference was held in Melbourne, Australia
2. 'No money for terror' conference-2020 will be held in India
3. G-20 Conference in 2021 will be held in India
4. G-20 Conference in 2022 will be held in India
Which of the above are true
A)2,3   B) 2,4   C) 1,2,3   D) 1,2,4

6. Observe the following?
1. 6th parliamentary summit of G20 countries, held in Tokyo, Japan
2. 6th parliamentary summit of G20 countries, held in Beijing, China
3. In 2020, G-20 summit will be held in Italy
4. In 2020, G-20 summit will be held in Saudi Arabia

Maharashtra under President's Rule

✔ Over a fortnight after the declaration of Assembly election results, Maharashtra came under the President's Rule and its assembly being kept under the suspended animation as the political stalemate continued with Congress and NCP saying they will bring a finality to their talks before discussions with Shiv Sena on forming a non-BJP government. Shiv Sena, which has been keen on a party nominee becoming chief minister, moved the Supreme Court against Governor Bhagat Singh Koshyari's decision not to extend the time given to it to prove its ability to form the government in the state

Which of the above are correct
A)2,3   B) 1,3   C) 1,4   D) 2,4

7. Assertion: The Union Cabinet approved the signing of a protocol amending the convention between India and Brazil
Reason: Both the countries want to avoid double taxation
A) Both A and R are true and R is the correct explanation of A
B) Both A and R are true but R is not the correct explanation of A
C) A is true but R is false
D) A is false but R is true

8. Who among the following has become the fastest Indian women cricketer to smash 2,000 runs in ODIs?
A) Mithali Raj
B) Smriti Mandhana
C) Harmanpreet Kaur
D) Poonam Raut

9. Observe the following?
1. 2023 FIH (International Hockey Federation) Hockey Men's World Cup host country-India
2. 2023 FIH (International Hockey Federation) Hockey Men's World Cup host country-Japan
3. ICC Men's T20 World Cup tournament host country-Australia
4. ICC Men's T20 World Cup tournament host country-England
Which of the above are true
A)1,4   B) 2,3   C) 1,3   D) 2,4

10. Assertion: Google builds App Defense Alliance
Reason: Google wants to ensure the safety of the Google Play Store by quickly finding potentially harmful apps
A) Both A and R are true and R is the correct explanation of A
B) Both A and R are true but R is not the correct explanation of A
C) A is true but R is false
D) A is false but R is true

11. 5 Indian Authors novels entered into BBC's 100 'Novels That Shaped Our World' list, match the authors with their books?
1. RK Narayan
   a. A House for Mr Biswas
2. Vikram Seth
   b. 'The Moor's Last Sigh'
3. VS Naipaul
   c. A Suitable Boy
4. Salman Rushdie
   d. Swami and Friends
5. Arundhathi Roy
   e. The God of Small Things
A) 1-b, 2-c, 3-a, 4-d, 5-e
B) 1-d, 2-c, 3-a, 4-b, 5-e
C) 1-d, 2-a, 3-c, 4-b, 5-e
D) 1-d, 2-e, 3-a, 4-b, 5-c

12. Match the following persons and awards?
1. Manjula Reddy
   a. 2019 Infosys Prize for Life Sciences
2. Gulab Kothari
   b. Raja Ram Mohan Roy Award
3. Venu Srinivasan
   c. Deming Award
A) 1-b, 2-a, 3-c   B) 1-b, 2-c, 3-a
C) 1-a, 2-b, 3-c   D) 1-c, 2-b, 3-a

For All Competitive Exams

13. Assertion: The Reserve Bank of India (RBI) mandated banks not to charge savings account holders for National Electronic Funds Transfer (NEFT) from January 2020
Reason: RBI introduced NEFT in 2005
A) Both A and R are true and R is the correct explanation of A
B) Both A and R are true but R is not the correct explanation of A
C) A is true but R is false
D) A is false but R is true

14. Assertion: Recently the Union Government has decided to set up 25 thousand crore rupees fund
Reason: Union Government wants to revive stalled housing projects
A) Both A and R are true and R is the correct explanation of A
B) Both A and R are true but R is not the correct explanation of A
C) A is true but R is false
D) A is false but R is true

15. Who among the following is the first Indian male cricketer to play 100 T20 is?
A) Virat Kohli
B) Shikhar Dhavan
C) Rohit Sharma
D) Mahendra Singh Dhoni

16. Samudra Shakthi is a joint exercise between India and.....?
A) Thailand   B) Japan
C) Sri Lanka   D) Indonesia

17. Assertion: Public sector Indian Bank has signed a memorandum of understanding with Muthoot Microfinance
Reason: Indian Bank wants to serve MSME sector
A) Both A and R are true and R is the correct explanation of A
B) Both A and R are true but R is not the correct explanation of A
C) A is true but R is false
(D) A is false but R is true

18. Observe the following?
1. Maternal Mortality Ratio, MMR, of

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India has declined by eight points in one year as per the latest special bulletin on MMR released by the Registrar General of India
2. MMR has declined from 130 per lakh live births in 2014-16 to 122 per lakh live births in 2015-17
3. India is on track to achieving the Sustainable Development Goal (SDG) set for reducing the MMR by 2025 which is five years ahead of the fixed time-line of 2030
Which of the above are correct
A)2,3   B) 1,2   C) 1,2,3   D) 1,3

19. Observe the following?
1. 18th Cabinet Secretary of India-TN Seshan
2. 10th Chief Election Commissioner of India-TN Seshan
3. He won in 1997 Presidential elections
4. He contested in 1997 Presidential elections
Which of the above are true
A)1,3   B) 1,2   C) 1,2,3   D) 1,2,4

20. Assertion: RBI has increased the household income limits for borrowers of Non-Banking Financial Companies (NBFCs) and microfinance institutions (MFIs) from 1 lakh to 1.25 lakh rupees
Reason: RBI wants to strengthen credit to those at the bottom of the economic pyramid in rural areas
A) Both A and R are true and R is the correct explanation of A
B) Both A and R are true but R is not the correct explanation of A
C) A is true but R is false
D) A is false but R is true

21. Who among the following is the youngest Indian to smash international fifty?
A) Shreyas Iyer   B) Harmanpreet Kaur
C) Shafali Verma   D) KL Rahul

22. In which of the following state, World's first CNG terminal is going to come up?
A) Rajasthan   B) Gujarat
C) Haryana   D) Maharashtra

23. Which of the following has become the first South Asian nation to criminalise offences related to match fixing?
A) Bangladesh   B) Pakistan
C) India   D) Sri Lanka

SC allows Ram temple construction at Ayodhya

✔ The Supreme Court pronounced in a historic judgement that a temple be constructed for Hindus on a 2.77- acre site in Uttar Pradesh's Ayodhya town. The five-judge Constitution bench, headed by Chief Justice of India Ranjan Gogoi, ruled unanimously that the spot, where frenzied right-wing mobs destroyed the four centuries- old Babri Masjid in 1992, should be handed over to a trust that the Centre must constitute in three months to oversee the construction of a temple, subject to conditions

ANSWERS

1-c	2-a	3-c	4-b	5-d	6-c
7-a	8-b	9-c	10-a	11-b	12-c
13-b	14-a	15-c	16-d	17-a	18-c
19-d	20-a	21-c	22-b	23-d	