# CIRCLES

MCQs & A and R WORK SHEET

**Test / Exam Name: Circles Mcq** | **Standard: 10th** | **Subject: Mathematics**

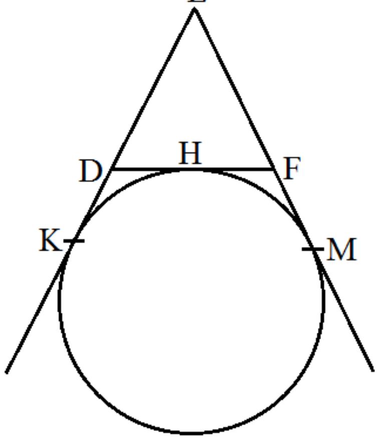
**Student Name:** ________________ **Section:** ____________ **Roll No.:** ________________

| Questions: 45 | Time: 01:00 hh:mm | Negative Marks: 0 | Marks: 45 |
|---|---|---|---|

## Instructions

1. MULTIPLE CHOICE QUESTIONS.

**Q1.** In Fig 2, a circle touches the side DF of ∠EDF at hand touches ED and EF produced at K and M respectively. If EK = 9cm, then the perimeter of △EDF (in cm) is: **1 Mark**




**A** 18 **B** 13.5 **C** 12 **D** 9

**Ans: A** 18

**Solution:**

We know that tangent segments to a circle from the same external point are congruent. Therefore, we have

EK = EM = 9cm

Now, EK + EM = 18cm

? ED + DK + EF + FM = 18cm

? ED + DH + EF + HF = 18cm

? ED + DF + EF = 18cm

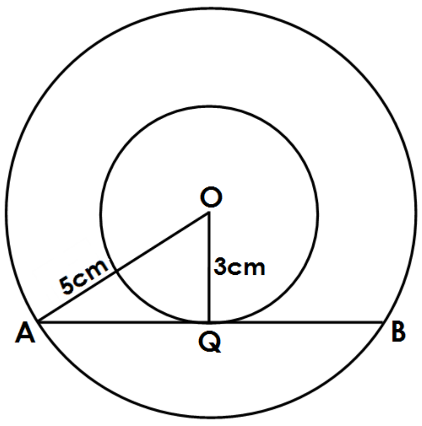
? Perimeter of △EDF = 18cm

**Q2.** Two concentric circles of radii 3cm and 5cm are given. Then length of chord BC which touches the inner circle at P is equal to: **1 Mark**

**A** 4cm **B** 6cm **C** 8cm **D** 10cm

**Ans: C** 8cm

**Solution:**




Here, radius OQ ⊥ to tangent AB then we say,

∠OQA = ∠OQB = 90°

and △OQA is right angle triangle then,

$AQ^2 = OA^2 - OQ^2$

? $AQ2 = 5^2 - 3^2$

? $AQ^2 = 25 - 9$

$\Rightarrow AQ^2 = \sqrt{16}$

? AQ = 4cm

By property of tangent.

BQ = BP(tangent from point B)

∵ OQ bisects AB then AQ = QB = 4cm

OP bisects AB then BP = PC = 4cm

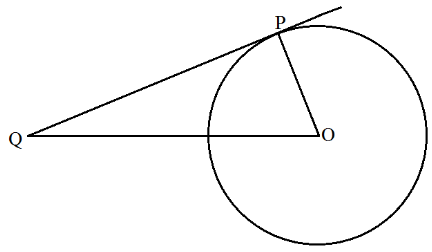
Now, we have to find BC,
BC = BP + PC
? BC = 4 + 4
? BC = 8cm.

**Q3.** The length of the tangent drawn from a point 8 cm away from the centre of a circle of radius 6 cm is: **1 Mark**

**A** $\sqrt{7}$cm **B** $2\sqrt{7}$cm **C** 10cm **D** 5cm

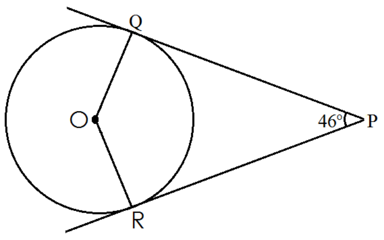
**Ans: B** $2\sqrt{7}$cm

**Solution:**
Let us first put the given data in the form of a diagram.




We know that the radius of a circle will always be perpendicular to the tangent at the point of contact. Therefore, OP is perpendicular to QP. We can now use Pythagoras theorem to find the length of QP.
$QP^2 = OQ^2 - OP^2$
$QP^2 = 8^2 - 6^2$
$QP^2 = 64 - 36$
$QP^2 = 28$
$QP = \sqrt{28}$
$QP = 2\sqrt{7}$

**Q4.** In the figure, PQ and PR are two tangents to a circle with centre O. If $\angle QPR = 46^\circ$ then $\angle QOR$ equals: **1 Mark**




**A** 67° **B** 134° **C** 44° **D** 46°

**Ans: B** 134°

**Solution:**
$\angle OQP = 90^\circ$ [Tangent is ? to the radius through the point of contact]
$\angle ORP = 90^\circ$
$\angle OQP + \angle QPR + \angle ORP + \angle QOR = 360^\circ$ [Angle sum property of a quad.]
$90^\circ + 46^\circ + 90^\circ + \angle QOR = 360^\circ$
$\angle QOR = 360^\circ - 90^\circ - 46^\circ - 90^\circ = 134^\circ$

**Q5.** In Fig. 1, O is the centre of a circle, AB is a chord and AT is the tangent at. If $\angle AOB = 100^\circ$ then $\angle BAT$ is equal to: **1 Mark**

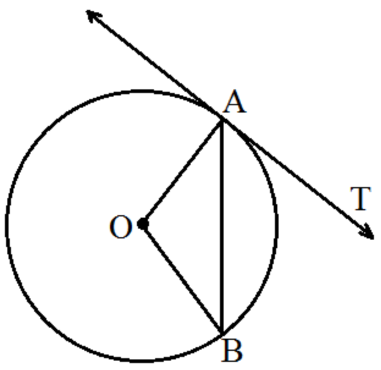



Fig. 1

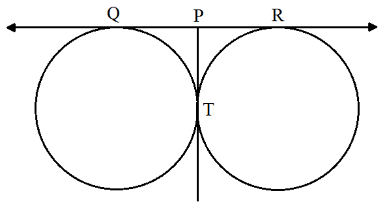
**A** $100^\circ$ **B** $40^\circ$ **C** $50^\circ$ **D** $90^\circ$

**Ans: D** $90^\circ$

**Solution:**
In $\angle OAB$,
OA = OB (radii)
$\Rightarrow \angle OAB = \angle OBA$
But, $\angle OBA + \angle OBA + \angle AOB = 180^\circ$
$\angle AOB = 180^\circ - 100^\circ$
$\angle OAB = 40^\circ$
$\angle OAB + \angle BAT = 90^\circ$ (Radius is perpendicular to tangent)
$40^\circ + \angle BAT = 90^\circ$

$\angle BAT = 50°$

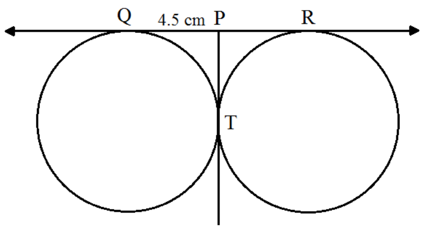
**Q6.** In the figure, two equal circles touch each other at T, if QP = 4.5cm, then QR = **1 Mark**




**A** 9cm **B** 18cm **C** 15cm **D** 13.5cm

**Ans:** **A** 9cm

**Solution:**




In the figure, two equal circles touch, each other externally at T

QR is the common tangent QP = 4.5cm

PQ = PT (tangents from P to the circle)

Similarly PT = PR

PQ = PT = PR

Now QR = PQ + PR = 4.5 + 4.5 = 9cm

**Q7.** In Figure 1, AP, AQ and BC are tangents to the circle. If AB = 5cm, AC = 6cm and BC = 4cm, then the length of AP (in cm) is: **1 Mark**

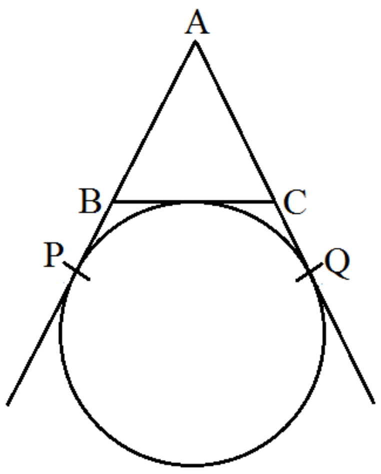
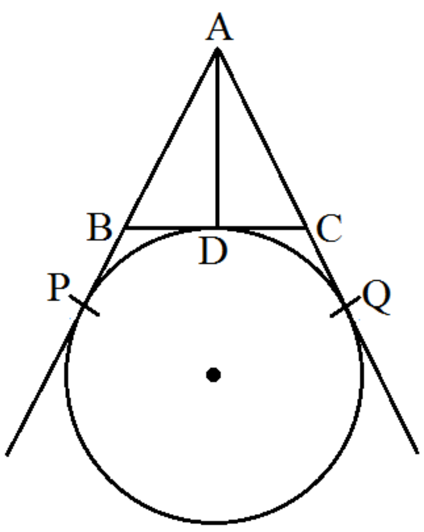



Figure 1

**A** 7.5 **B** 15 **C** 10 **D** 9

**Ans:** **A** 7.5

**Solution:**




We know that tangent segments to a circle from the same external point are congruent

Therefore, we have

AP = AQ

BP = BD

CQ = CD

Now,

AB + BC + AC = 5 + 4 + 6

? AB + BD + DC + AC = 15cm

? AB + BP + CQ + AC = 15cm

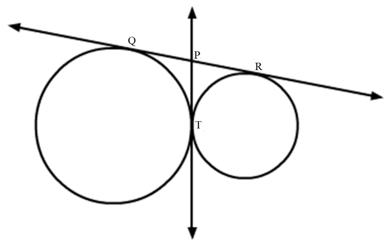
? AP + AQ = 15cm

? 2AP = 15cm

? AP = 7.5cm

**Q8.** **1 Mark**

In the given figure, QR is a common tangent to the given circles touching externally at the point T. The tangent at T meets QR at P. If PT = 3.8cm, then the length of QR (in cm) is:



**A** 3.8 **B** 7.6 **C** 5.7 **D** 1.9

**Ans: B** 7.6

**Solution:**

It is given that QR is a common tangent to the given circles touching externally at the point T. Also, the tangent at T meets QR at P such that PT = 3.8cm.

Now, PQ and PT are tangents drawn to the same circle from an external point.

$\therefore$ PQ = PT = 3.8cm (Lengths of tangents drawn from an external point to a circle are equal)

PR and PT are tangents drawn to the same circle from an external point T.

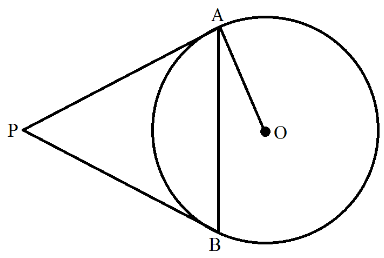
$\therefore$ PR = PT = 3.8cm (Lengths of tangents drawn from an external point to a circle are equal)

Now,

QR = PQ + PR = 3.8cm + 3.8cm = 7.6cm

Thus, the length of QR is 7.6cm.

**Q9.** In Fig. 2, PA and PB are tangents to the circle with centre O. If $\angle APB = 60^\circ$ then $\angle OAB$ is: **1 Mark**

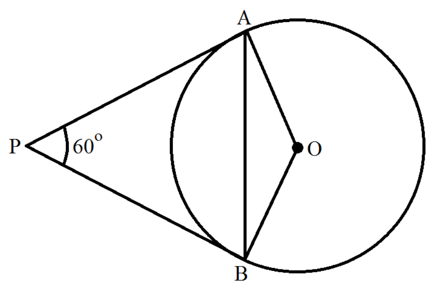



**A** $30^o$ **B** $60^o$ **C** $90^o$ **D** $15^o$

**Ans: A** $30^o$

**Solution:**

**Construction:** Join OB.




We know that the radius and tangent are perpendicular at their point of contact

$\because \angle OBP = \angle OAP = 90^\circ$

Now, in quadrilateral AOBP

$\angle AOB + \angle OBP + \angle APB + \angle OAP = 360^\circ$

$\Rightarrow \angle AOB + 90^\circ + 60^\circ + 90^\circ = 360^\circ$

$\Rightarrow 240^\circ + \angle AOB = 360^\circ$

$\Rightarrow \angle AOB = 120^\circ$

Now, in isosceles triangle AOB

$\angle AOB + \angle OAB + \angle OBA = 180^\circ$

$\Rightarrow 120^\circ + 2\angle OAB = 180^\circ$

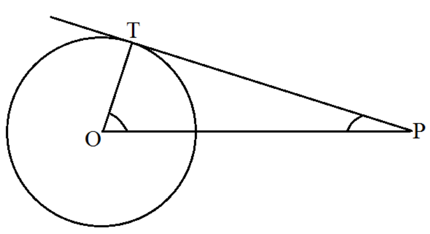
$\Rightarrow \angle OAB = 30^\circ$

**Q10.** If PT is tahgent drawn froth a point P to a circle touching it at T and O is the centre of the circle, then $\angle OPT + \angle POT =$ **1 Mark**

**A** $30^o$ **B** $60^o$ **C** $90^o$ **D** $180^o$

**Ans: C** $90^o$

**Solution:**




In the figure, PT is the tangent to the circle with centre O.

OP and OT are joined

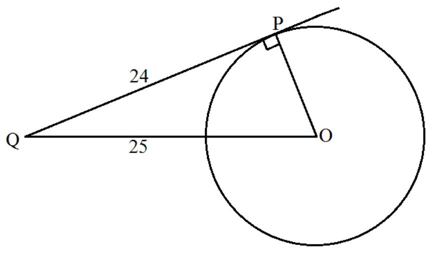
PT is tangent and OT is the radius
OT ? PT
Now in right $\triangle OTP$
$\angle OTP = 90°$
$\angle OPT + \angle POT = 180° - 90° = 90°$

**Q11.** From a point Q, the length of the tangent to a circle is 24cm and the distance of Q from the centre is 25cm. The radius of the circle is: **1 Mark**

**A** 7cm **B** 12cm **C** 15cm **D** 24.5cm

**Ans:** **A** 7cm

**Solution:**



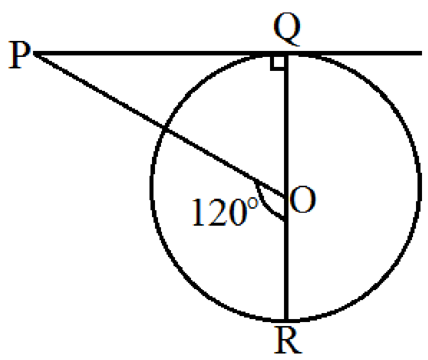

We know, radius always perpendicular to tangent so we say $\triangle OPQ$ is right angle triangle then $\angle OPQ = 90°$
Now, we have to find OP
$?OP^2 = OQ^2 - PQ^2$
$? OP^2 = 25^2 - 24^2$
$? OP^2 = 625 - 576$
$\Rightarrow OP = \sqrt{49}$
$? OP = 7cm$
Hence, correct choice is (A)

**Q12.** PQ is a tangent drawn from a point P to a circle with centre O and QOR is a diameter of the circle such that $\angle POR = 120°$ then $\angle OPQ$ is: **1 Mark**

**A** 60° **B** 45° **C** 30° **D** 90°

**Ans:** **C** 30°

**Solution:**



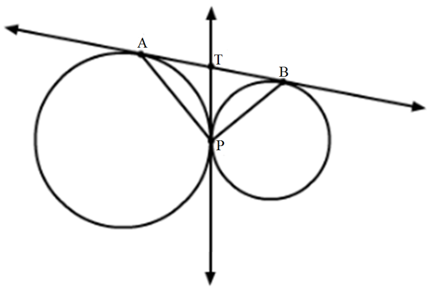

we know, radius always ⊥ to tangent, then
$\angle PQO = 90°(OQ \perp PQ)$
Given, $\angle POR = 120°$
then, $\angle POQ = \angle QOR - \angle POR$
$\Rightarrow \angle POQ = 180° - 120°$
$\Rightarrow \angle POQ = 60°$
Now, In $\triangle OPQ$
Sum of all angles are equal to $180°$
then,
$\angle OPQ + \angle POQ + \angle PQO = 180°$
$\Rightarrow \angle OPQ + 90° + 60° = 180°$
$\Rightarrow \angle OPQ + 150° = 180°$
$\Rightarrow \angle OPQ = 30°$

**Q13.** Two circles touch each other externally at P. AB is a common tangent to the circle touching them at A and B. The value of $\angle APB$ is: **1 Mark**

**A** 30º **B** 45º **C** 60º **D** 90º

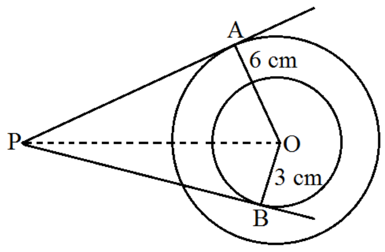
**Ans:** **D** 90º

**Solution:**




It is given that two circles touch each other externally at P. AB is a common tangent to the circle touching them at A and B.
Draw a tangent to the circle at P, intersecting AB at T.
Now, TA and TP are tangent drawn to the same circle from an external point T.
∴ TA = TP (Length of tangents drawn from an external point to a circle are equal)
TB and TP are tangent drawn to the same circle from an external point T.
∴ TB = TP (Length of tangents drawn from an external point to a circle are equal)
In △ATP
TA = TP
∴ $\angle APT = \angle PAT...(1)$(In a triangle, equal sides have equal angles opposite to them)
In △BTP,
TB = TP
∴ $\angle BPT = \angle PBT...(2)$(In a triangle, equal sides have equal angles opposite to them)
Now, in △APB,
$\Rightarrow \angle APB + \angle PAB + \angle PBA = 180°$(Angle sum property)
$\Rightarrow \angle APB + \angle APT + \angle BPT = 180°$[From (1) and (2)]
$\Rightarrow \angle APB + \angle APB = 180°$
$\Rightarrow 2\angle APB = 180°$
$\Rightarrow \angle APB = 90°$
Thus, the value of $\angle APB$ is $90°$

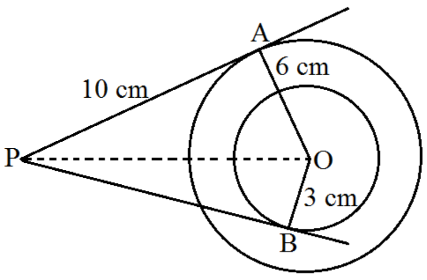
**Q14.** In the figure, if AP = 10cm, then BP = **1 Mark**




**A** $\sqrt{91}$cm **B** $\sqrt{127}$cm **C** $\sqrt{119}$cm **D** $\sqrt{109}$cm

**Ans: B** $\sqrt{127}$cm

**Solution:**



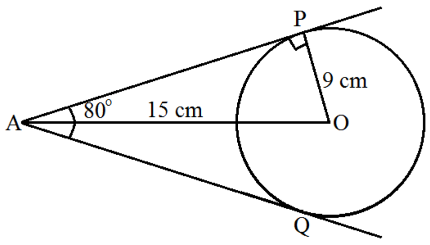

In the figure,
OA = 6cm, OB = 3cm and AP = 10cm
OA is radius and AP is the tangent
OA ? AP
Now in right △OAP
$OP^2 = AP^2 + OA^2 = (10)^2 + (6)^2 = 100 + 36 = 136$
Similarly BP is tangent and OB is radius
$OP^2 = OB^2 + BP^2$
$136 = (3)^2 + BP^2$
$136 = 9 + BP^2$
? $BP^2 = 136 - 9 = 127$
$BP = \sqrt{127}$cm

**Q15.** AP and AQ are tangents drawn from a point A to a circle with centre O and radius 9cm. If OA = 15cm, then AP + AQ = **1 Mark**

**A** 12cm **B** 18cm **C** 24cm **D** 36cm

**Ans: C** 24cm

**Solution:**




By the property of tangent

AP = AQ (tangent from A)...(i)

We know, radius always ⊥ to tangent then △OPQ is right angle triangle the ∠OPA = 90 °

Now, $AP^2 = OA^2 - OP^2$

? $AP^2 = 15^2 - 9^2$

? $AP^2 = 225 - 81$

? $AP = \sqrt{144}$

? AP = 12cm

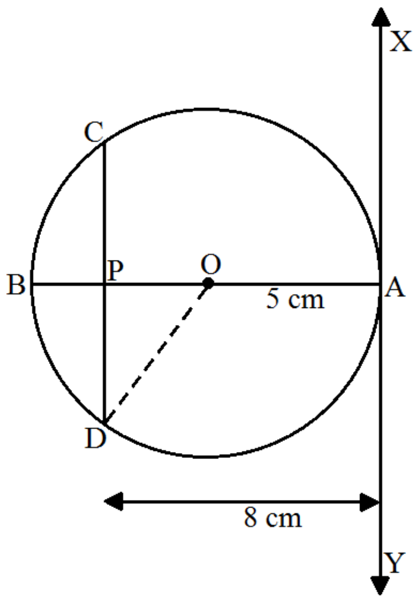
we have to find AP + AQ = 12 + 12 = 24cm [from(i)]

**Q16.** At one end A of a diameter AB of a circle of radius 5cm, tangent XAY is drawn to the circle. The length of the chord CD parallel to XY and at a distance 8cm from A is: **1 Mark**

**A** 4cm **B** 5cm **C** 6cm **D** 8cm

**Ans: D** 8cm

**Solution:**




XY is the tangent to the circle with centre O.

CD is the chord.

OA = OB = OD = 5cm (radii)

PA = 8cm

PO = 3cm

In △POD,

? $PD^2 + PO^2 = OD^2$

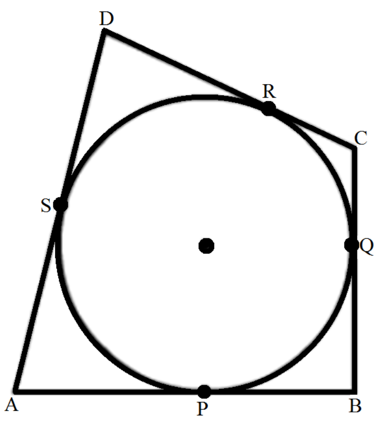
? $3^2 + PD^2 = 5^2$

? $PD^2 = 25 - 9 = 16$

? PD = 4cm

Hence, CD = CP + PD = 4 + 4 = 8cm.

**Q17.** In the figure, a quadrilateral ABCD is drawn to circumscribe a circle such that its sides AB, BC, CD and AD touch the circle at P, Q, R and S respectively. If AB = x cm, BC= 7cm, CR = 3cm and AS = 5cm, then x = **1 Mark**




**A** 10 **B** 9 **C** 8 **D** 7

**Ans: B** 9

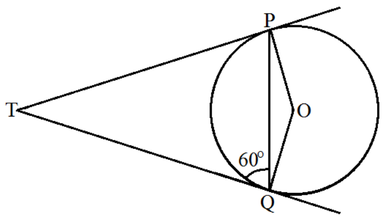
**S = 5cm**

**CR and CQ are tangents to the circle from C**

**CR = CQ = 3cm**

**BQ = BC – CQ = 7 – 3 = 4cm**
**BQ = and BP are tangents from B**
**BP = BQ = 4cm**
**AS and AP are tangents from A**
**AP = AS = 5cm**
**AB = AP + BP = 5 + 4 = 9cm**
**x = 9cm**

**Q18.** In the figure, if TP and TQ are tangents drawn from an external point T to a circle with centre O such that $\angle TQP = 60^\circ$, then: **1 Mark**



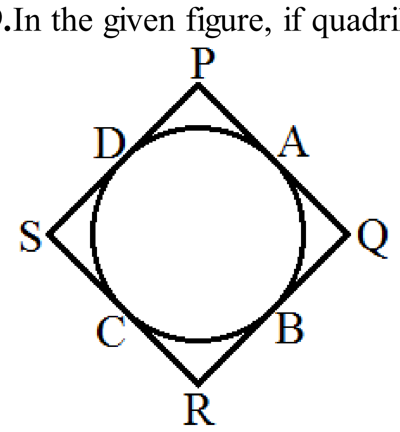

**A** 25° **B** 30° **C** 40° **D** 60°

**Ans: B** 30°

**Solution:**

In the figure, TP and TQ are the tangents drawn from T to the circle with centre O. OP, OQ and PQ are joined.
$\angle TQP = 60^\circ$
TP = TQ (Tangents from T to the circle)
$\angle TPQ = \angle TQP = 60^\circ$
$\angle PTQ = 180^\circ - (60^\circ + 60^\circ) = 180^\circ - 120^\circ = 60^\circ$
and $\angle PTQ = 180^\circ - (60^\circ + 60^\circ) = 180^\circ - 120^\circ = 60^\circ$
But OP = OQ (radii of the same circle.)
$\angle OPQ = \angle OQP$
But $\angle OPQ + \angle OQP = 180^\circ - 120^\circ = 60^\circ$
But $\angle OQP = 30^\circ$

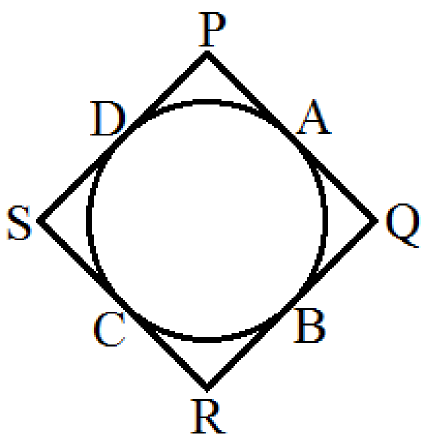
**Q19.** In the given figure, if quadrilateral PQRS circumscribes a circle, then PD + QB = **1 Mark**




**A** PQ **B** QR **C** PR **D** PS

**Ans: A** PQ

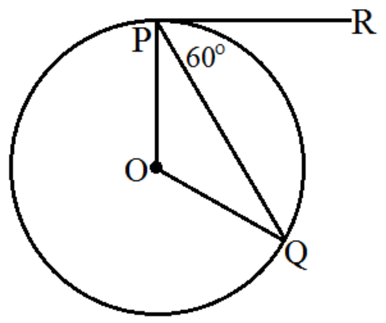
**Solution:**




We know that tangents drawn to a circle from the same external point will be equal in length.
Therefore,
PD = PA …… (1)
QB = QA …… (2)
Adding equations (1) and (2), we get,
PD + QB = PA + QA
By looking at the figure we can say,
PD + QB = PQ.

**Q20.** **1 Mark**

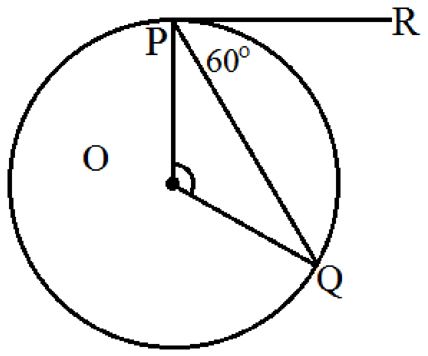
In the figure, if PR is tangent to the circle at P and Q is the centre of the circle, then ∠POQ =




**A** 110° **B** 100° **C** 120° **D** 90°

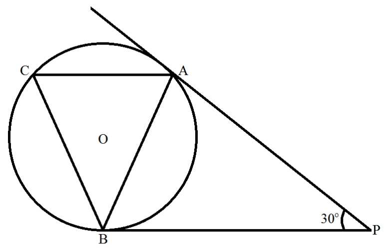
**Ans: C** 120°

**Solution:**




We know, radius OP⊥ to tangent PR then $\angle OPR = 90^\circ$
Now,
$\angle OPQ = \angle OPR - \angle QPR$
$\angle OPQ = 90^\circ - 60^\circ$
$\angle OPQ = 30^\circ$
In △OPQ,
OP = OQ (radius of circle)
$\angle OPQ = \angle OQP = 30^\circ$(opposite angle of same side)
we also know that sum of all angle of triangle is 180°, then
$\angle OPQ + \angle OQP + \angle POQ = 180^\circ$
$\Rightarrow 30^\circ + 30^\circ + \angle POQ = 180^\circ$
$\Rightarrow \angle POQ = 120^\circ$

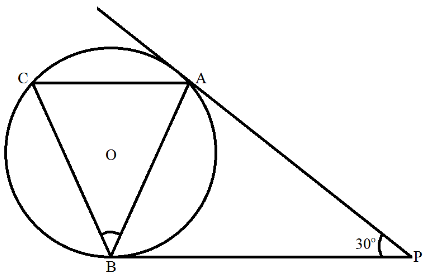
**Q21.** In the figure, if tangents PA and PB are drawn to a circle such that $\angle APB = 30^\circ$ and chord AC is drawn parallel to the tangent PB, then $\angle ABC =$ **1 Mark**




**A** 60° **B** 90° **C** 30° **D** None of these

**Ans: C** 30°

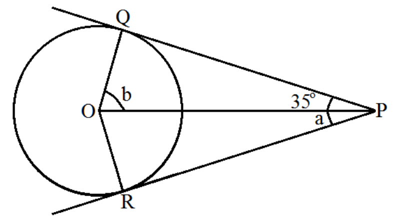
**Solution:**




By property of tangent PA = PB (tangent from P)
then, In △ABP
PA = PB and $\angle PAB = \angle ABP$
Sum of all angles of triangle APB is 180°
$\angle PAB + \angle ABP + \angle APB = 180^\circ$
$\Rightarrow \angle ABP + \angle ABP + 30^\circ = 180^\circ$
$\Rightarrow 2\angle ABP = 150^\circ$
$\Rightarrow \angle ABP = 75^\circ$
$\angle ABP = \angle BAC = 75^\circ$(Alternate algles)
$\angle ABP = \angle ACB = 75^\circ$(Alternate segment theorem)
Now, sum of all angles of △ABC 180°
$\Rightarrow \angle BAC + \angle ACB + \angle ABC = 180^\circ$
$\Rightarrow 75^\circ + 75^\circ + \angle ABC = 180^\circ$

$\Rightarrow \angle ABC = 30^\circ$

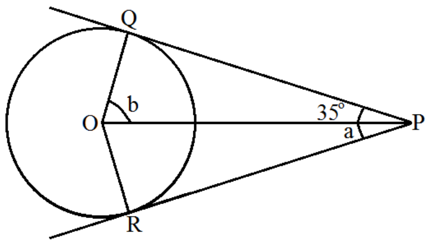
**Q22.** In the given figure, PQ and PR are tangents drawn from P to a circle with centre O. If $\angle OPQ = 35^\circ$, then: **1 Mark**




**A** a= 30°, b= 60° **B** a= 35°, b = 55° **C** a= 40°, b = 50° **D** a= 45°, b = 45°

**Ans: B** a= 35°, b = 55°

**Solution:**




We know, radius always ⊥ TP tangent

$OQ \perp QP$

$OR \perp RP$

From above eq. $\triangle OQP$ and $\triangle ORP$ is right angle triangle then,

$\angle OQP = \angle ORP = 90^\circ$

$\triangle OQP \sim \triangle ORP$

then $\angle QPO = \angle RPO = 35^\circ = \angle a$

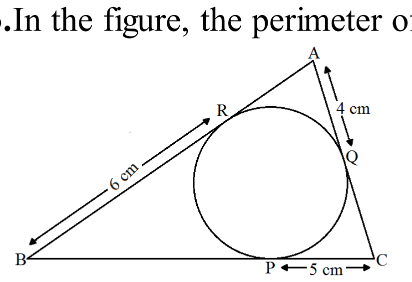
sum of all angles in $\triangle OQP$ is 180°

$\angle OQP + \angle QPO + \angle QOP = 180^\circ$

$\Rightarrow 90^\circ + 35^\circ + \angle b = 180^\circ$

$\Rightarrow \angle b = 55^\circ$

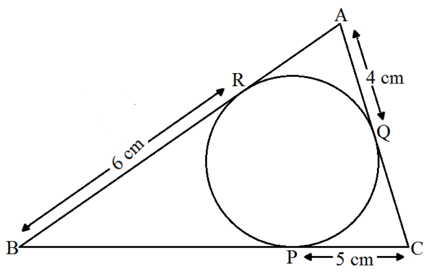
**Q23.** In the figure, the perimeter of $\triangle ABC$ is: **1 Mark**




**A** 30cm **B** 60cm **C** 45cm **D** 15cm

**Ans: A** 30cm

**Solution:**




By the property of tangent

AO = AR = 4cm (tangent from A)

BR = BP = 6cm (tangent from B)

PC = CQ = 5cm (tangent from C)

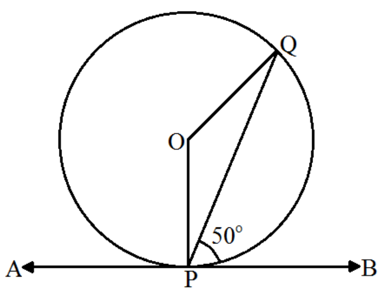
Perimeter of $\triangle ABC$ = AB + BC + CA

Perimeter of $\triangle ABC$ = AR + BR + BP + PC + CQ + QA

Perimeter of $\triangle ABC$ = 4 + 6 + 6 + 5 + 5 + 4

Perimeter of $\triangle ABC$ = 30cm

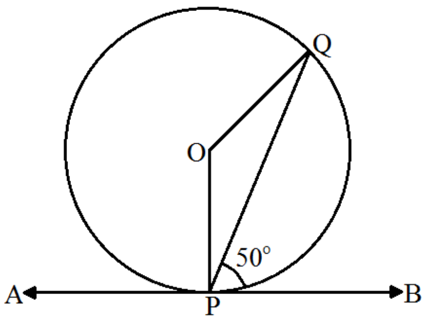
**Q24.** In the figure, APB is a tangent to a circle with centre O at point P. If $\angle QPB = 50^\circ$ then the measure of $\angle POQ$ is: **1 Mark**




**A** 100° **B** 120° **C** 140° **D** 150°

**Ans: A** 100°

**Solution:**




In the figure, APB is a tangent to the circle with centre O.

$\angle QPB = 50^\circ$

OP is radius and APB is a tangent.

OP ? AB

$\Rightarrow OPB = 90^\circ$

$\Rightarrow \angle OPQ + \angle QPB = 90^\circ$

$\angle OPQ + 50^\circ = 90^\circ$

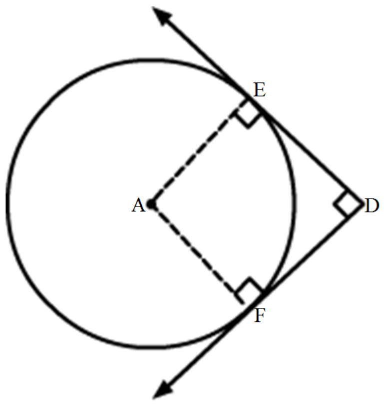
$\Rightarrow \angle OPQ = 90^\circ - 50^\circ = 40^\circ$

But OP = OQ

$\angle OPQ = \angle OQP = 40^\circ$

$\angle POQ = 180^\circ - (40^\circ + 40^\circ) = 180^\circ - 80^\circ = 100^\circ$

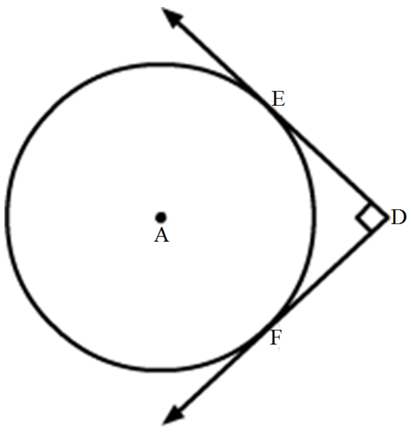
**Q25.** In the given figure, DE and DF are tangents from an external point D to a circle with centre A. If DE = 5cm and DE ⊥ DF, then the radius of the circle is: **1 Mark**




**A** 3cm **B** 5cm **C** 4cm **D** 6cm

**Ans: B** 5cm

**Solution:**




join AE and AF.

Now, DE is a tangent at E and AE is the radius through the point of contact E.

$\therefore \angle AED = 90^\circ$ (Tangent at any point of a circle is perpendicular to the radius through the point of contact)

Also, DF is a tangent at F and AF is the radius through the point of contct F.)

$\therefore \angle AFD = 90^\circ$ (Tangent at any point of a circle is perpendicular to the radius through the point of contact)

$\therefore \angle EDF = 90^\circ$ (DE⊥DF)

Also, DF = DE (length of tangents drawn from an external point to a circle are equal)

so, AEDF is a square.

$\therefore$ AE = AF = DE = 5cm (sides if square are equal)

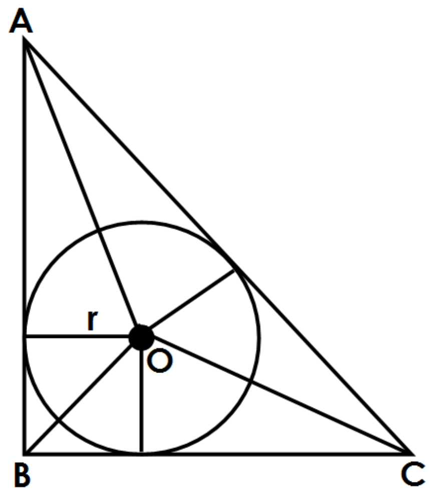
Thus, the radius of the circle is 5cm.

**Q26.** In a right triangle ABC, right angled at B, BC = 12cm and AB = 5cm. The radius of the circle inscribed in the triangle (in cm) is: **1 Mark**

**A** 4 **B** 3 **C** 2 **D** 1

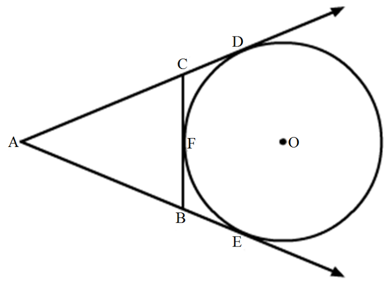
**Ans: C** 2

**Solution:**




? $AC^2 = AB^2 + (BC)^2$ [Pythagoras theorem]
? $AC^2 = 25 + 144 = 169$
? AC = 13cm
ar. of $\triangle ABC$ = ar. of $\triangle AOB$ + ar. of $\triangle BOC$ + ar. of $\triangle AOC$
$$\frac{5\times 12}{2} = \frac{AB\times r}{2} + \frac{BC\times r}{2} + \frac{AC\times r}{2}$$
$60 = r(AB + BC + AC)$ [ $\because$ Area of $\triangle = \frac{\text{Base}\times\text{Corr.alt}}{2}$]
$60 = r(5 + 12 + 13)$
$60 = 30r \Rightarrow r = 2cm$

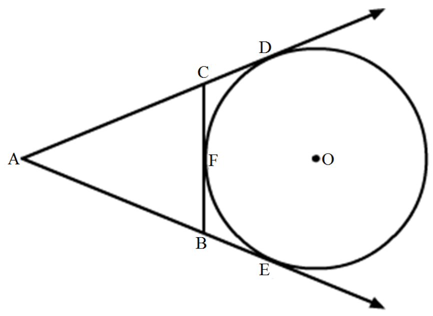
**Q27.** In the given figure, if AD, AE and BC are tangents to the circle at D, E and F respectively, Then: **1 Mark**




**A** AD = AB + BC + CA **B** 2AD = AB + BC + CA **C** 3AD = AB + BC + CA **D** 4AD = AB + BC + CA

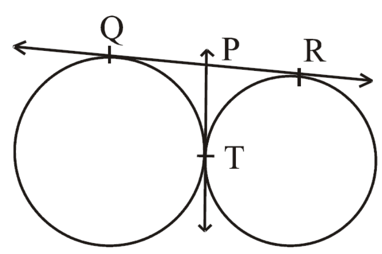
**Ans: B** 2AD = AB + BC + CA

**Solution:**




By the property of tangent
AC = AB (tangent from A)...(i)
CD = CF (tangent from C)...(ii)
BF = BE (tangent from B)...(iii)
Now taking RHS,
AB + BC + CA = AB + BF + FC + CA
AB + BC + CA = AB + BE + CD + CA [ from (ii) & (iii) ]
AB + BC + CA = AE + AD
AB + BC + CA = 2AD

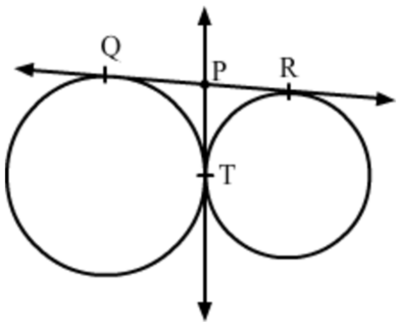
**Q28.** In Fig. 1, QR is a common tangent to the given circles, touching externally at the point T. The tangent at T meets QR at P. If PT = 3.8cm, then the length of QR (in cm) is: **1 Mark**




**A** 3.8 **B** 7.6 **C** 5.7 **D** 1.9

**Ans: B** 7.6

**Solution:**




It is known that the length of the tangents drawn from an external point to a circle are equal.

∴ QP = PT = 3.8cm ....(1)

PR = PT = 3.8 cm ....(2)

From equations (1) and (2), we get:

QP = PR = 3.8 cm

Now, QR = QP + PR

= 3.8cm + 3.8cm

= 7.6cm

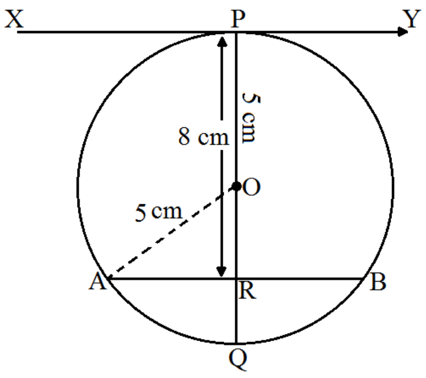
Hence, the correct option is B.

**Q29.** At one end of a diameter PQ of a circle of radius 5cm, tangent XPY is drawn to the circle. The length of chord AB parallel to XY and at distance of 8cm from P is: **1 Mark**

**A** 5cm **B** 6cm **C** 7cm **D** 8cm

**Ans: D** 8cm

**Solution:**




In the figure, PQ is diameter XPY is tangent to the circle with centre O and radius 5cm From P, at a distance of 8cm AB is a chord drawn parallel to XY.

To find the length of AB Join OA

XY is tangent and OP is the radius.

OP ? XY or PQ ? XY

AB || XY

OQ is ? AB which meets AB at R

Now in right △OAR

$OA^2 = OR^2 + AR^2$

$(5)^2 = (3)^2 + AR^2$

$25 = 9 + AR^2$

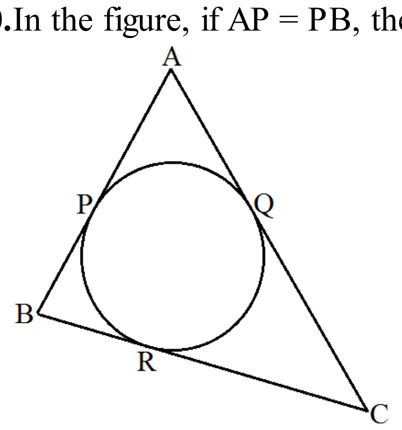
? $AR^2 = 25 - 9 = 16 = (4)^2$

AR = 4cm

But R is mid-point of AB

AB = 2 AR = 2 x 4 = 8cm

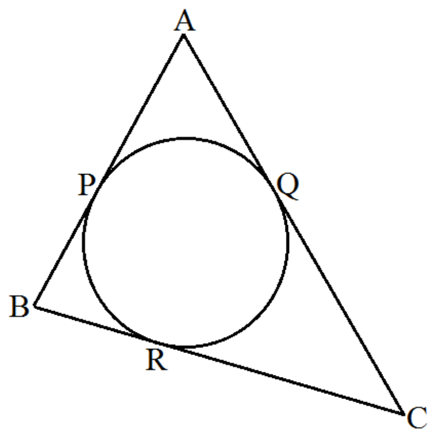
**Q30.** In the figure, if AP = PB, then: **1 Mark**




**A** AC = AB **B** AC = BC **C** AQ = QC **D** AB = BC

**Ans: B** AC = BC

**Solution:**




In the figure, AP = PB
But AP and AQ are the tangent from A to the circle.
AP = AQ
Similarly PB = BR
But AP = PB (given)
AQ = BR ….(i)
But CQ and CR the tangents drawn from C to the circle
CQ = CR
Adding in (i)
AQ + CQ = BR + CR
AC = BC

**Q31.** In a right triangle ABC, right-angled at B, BC = 12cm and AB = 5cm. The radius of the circle inscribed in the triangle (in cm) is: **1 Mark**

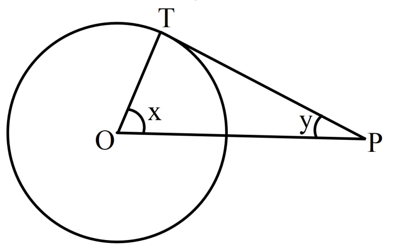
**A** 4 **B** 3 **C** 2 **D** 1

**Ans: C** 2

**Solution:**

Let r is the radius of the circle.
From the figure,
OP = OQ = OR = r
In triangle ABC,
From Pythagoras Theorem,
? $AC^2 = AB^2 + BC^2$
? $AC^2 = 5^2 + (12)^2$
? $AC^2 = 25 + 144$
? $AC^2 = 169$
? AC = 13
Now,
area(△AOB) + area(△BOC) + area(△AOC) = area(AOB)
Now,
$s = \frac{(5+12+13)}{2} = \frac{30}{2} = 15$
So, area(△AOB) + area(△BOC) + area(△AOC) = area(AOB)
$\Rightarrow \frac{(OP \times AB)}{2} + \frac{(OP \times AB)}{2} + \frac{(OP \times AB)}{2} = \sqrt{\{s \times (s - a) \times (s - b) \times (s - c)\}}$
$\Rightarrow \frac{\{(OP \times AB) + (OP \times AB) + (OP \times AB)\}}{2} = \sqrt{\{15 \times (15 - 5) \times (15 - 13) \times (15 - 13)\}}$
$\Rightarrow \frac{\{15 + 12r + 13r\}}{2} = \sqrt{\{15 \times 10 \times 3 \times 2\}}$
$\Rightarrow \frac{30r}{2} = \sqrt{900}$
$\Rightarrow 15r = 30$
$\Rightarrow r = \frac{30}{15}$
$\Rightarrow r = 2$
So, the radius of the circle is 2cm.

**Q32.** If PT is a tangent to the circle with centre O, then x + y is equal to: **1 Mark**




**A** 90° **B** 60° **C** 75° **D** 100°

**Ans:** **A** $90°$

**Solution:**

Here $\angle T = 90°$ [Angle between tangent and radius through the point of contact]

Now, in triangle OPT, we know that

$\angle O + \angle P + \angle T = 180°$

[Angle sum property of a triangle]

? $x + y + 90° = 180°$

? $x + y = 180°$

? $x + y = 90°$

**Q33.** In the given figure, there are two concentric circles with centre O. PR and PQS are tangents to the inner circle from point plying on the outer circle. If PR = 7.5cm, then PS is equal to: **1 Mark**

**A** 10cm **B** 12cm **C** 15cm **D** 18cm

**Ans:** **C** 15cm

**S = PQ + QS**

**? PS = PQ + PQ [from eq.(i)]**

**? PS = 7.5 + 7.5 [fromeq.(ii)]**

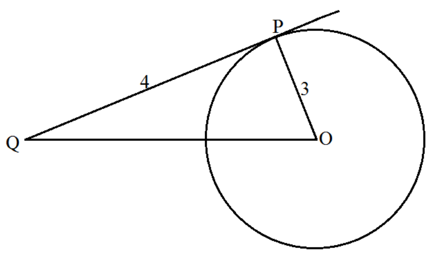
**? PS =15cm**

**Q34.** The length of the tangent from a point A at a circle, of radius 3 cm, is 4 cm. The distance of A from the centre of the circle is: **1 Mark**

**A** $\sqrt{7}$cm **B** 7cm **C** 5cm **D** 25cm

**Ans:** **C** 5cm

**Solution:**




We know, radius always perpendicular to tangent so we say △OPA is right angle triangle then $\angle OPA = 90°$

Now, we have to find OA

? $OA^2 = AP^2 + OP^2$

? $OA^2 = 4^2 + 3^2$

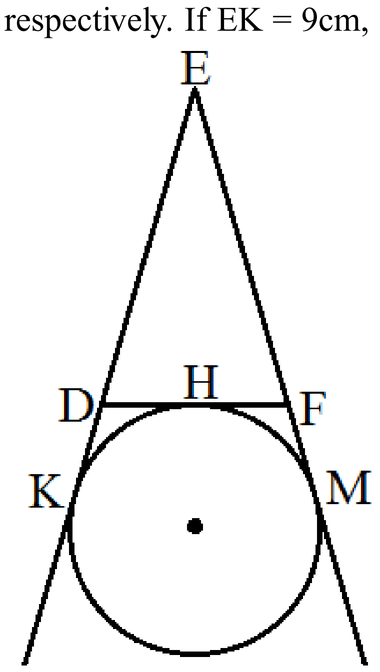
? $OA^2 = 16 + 9$

? $OA = \sqrt{25}$

? $OA = 5$

Hence, correct choice is (c)

**Q35.** In the figure, a circle touches the side DF of △EDF at H and touches ED and EF produced at K and M respectively. If EK = 9cm, then the perimeter △EDF of is: **1 Mark**




**A** 18cm **B** 13.5cm **C** 12cm **D** 9cm

**Ans:** **A** 18cm

**Solution:**

In △DEF

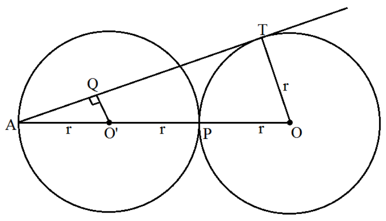
DF touches the circle at H and circle touches ED and EF Produced at K and M respectively.

EK = 9cm

EK and EM are the tangents to the circle.

EM = EK = 9cm
Similarly DH and DK are the tangent.
DH = DK and FH and FM are tangents.
FH = FM
Now, perimeter of △DEF
= ED + DF + EF
= ED + DH + FH + EF
= ED + DK + EM + EF
= EK + EM
= 9 + 9
= 18cm.

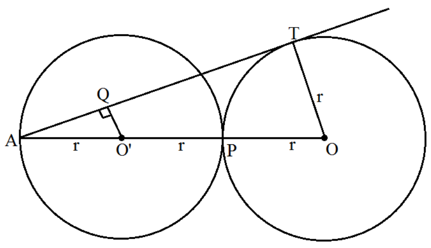
**Q36.** Two circles of same radii r and centres *O* and *O*' touch each other at *P* as shown in. If *O O*' is produced to meet the circle *C* (O', r) at *A* and *AT* is a tangent to the circle *C* (*O*,r) such that *O*'*Q* ⊥ *AT*. Then *AO*: *AO*' = **1 Mark**




**A** 3/2 **B** 2 **C** 3 **D** 1/4

**Ans: C** 3

**Solution:**




From the given figure we have,
AO = r + r + r
AO = 3r
AO’ = r
Therefore,

$\frac{AO}{AO'} = \frac{3r}{r}$

$\frac{AO}{AO'} = 3$

Also as O'Q ∥ OT therefore $\frac{AT}{AQ} = \frac{AO}{AO'}$

**Q37.** 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 = 29cm, AD = 23cm, ∠B = 90° and DS = 5cm, then the radius of the circle (in cm.) is: **1 Mark**

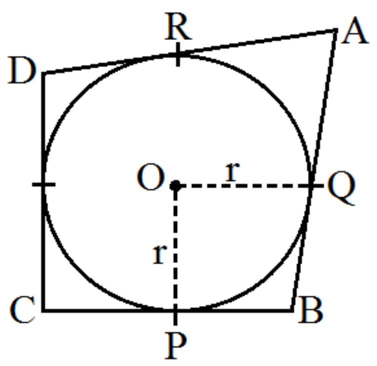



Fig. 2

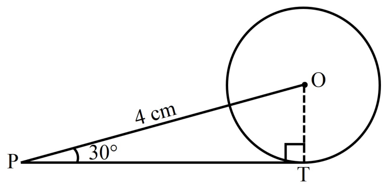
**A** 11 **B** 18 **C** 6 **D** 15

**Ans: A** 11

**S = 5cm,**
**Since DS and DR are tangents from the same external point to the circle, DS = DR = 5cm**
**Since AD = 23cm, AR = AD - DR = 23 - 5 = 18cm.**
**Similarly, AR and AQ are the tangents from the same external point to the circle and hence AR = AQ = 18cm.**
**Since AB = 29cm, BQ = AB - AQ = 29 - 18 = 11cm.**
**Since CB and AB are the tangents to the circle, angle OPB and angle OQB is equal to 900.**
**Given that angle B is 900 and hence angle POQ is also equal to 900 and hence OQBP is a square.**
**Since BQ is 11cm, the side of the square OQBP is 11cm**

**From the figure it is clear that the side of the square is the radius of the circle and hence radius of the circle is 11cm.**

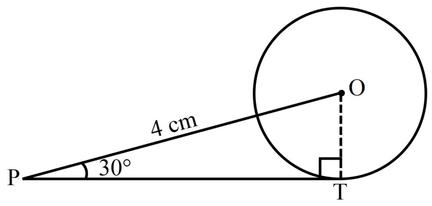
**Q38.** In figure, PT is tangent to the circle with centre O such that OP is 4cm and $\angle OPT = 30^\circ$ length of tangent is given by: **1 Mark**




**A** $4\sqrt{3}$cm **B** 7cm **C** 5cm **D** $2\sqrt{3}$cm

**Ans: D** $2\sqrt{3}$cm

**Solution:**




In right angled triangle OPT,

$\cos 30^\circ = \frac{PT}{PO} \Rightarrow$

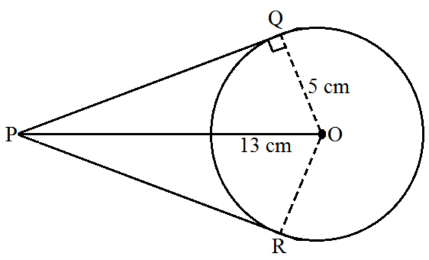
$\frac{\sqrt{3}}{2} = \frac{PT}{4} = PT = 2\sqrt{3}cm$

**Q39.** From a point P which is at a distance 13cm from the centre O of a circle of radius 5cm, the pair of tangent PQ and PR to the circle are drawn. Then the area of the quadrilateral PQOR is: **1 Mark**

**A** $60cm^2$ **B** $65cm^2$ **C** $30cm^2$ **D** $32.5cm^2$

**Ans: A** $60cm^2$

**Solution:**




Firstly, draw a circle of radius 5cm having centre O.

P is a point at a distance of 13cm from O.

A pair of tangents PQ and PR are drawn.

Thus, quadrilateral PQOR is formed.

OQ ? QP [since, AP is a tangent line]

In right angled $\triangle POQ$

? $OP^2 = OQ^2 + QP^2$

? $13^2 = 5^2 + QP^2$

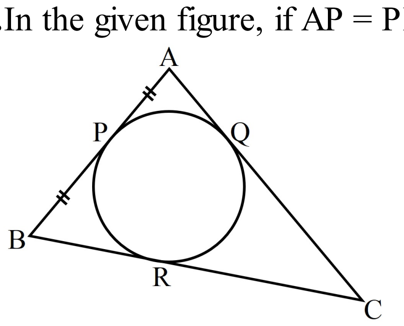
? $QP^2 = 169 - 25 = 144 = 12^2$

? QP = 12cm

Now, area of $\triangle OQP = \frac{1}{2} \times QP \times QO = \frac{1}{2} \times 12 \times 5 = 30cm^2$

Area of quadilateral QORP = $2\triangle OQP = 2 \times 30 = 60cm^2$

**Q40.** In the given figure, if AP = PB, then AC = **1 Mark**




**A** AC = BC **B** AB = BC **C** AQ = QC **D** AC = AB

**Ans: A** AC = BC

**Solution:**

Since Tangents from an external point to a circle are equal

∴ PB = BR …(i)

PA = AQ …(ii)

CQ = CR …(iii)

Adding eq. (i) and (iii), we get

PB + CQ = BR + CR

? AP + CQ = BC [Given: PB = AP]
? AQ + CQ = BC [From eq. (ii) AP = AQ]
? AC = BC

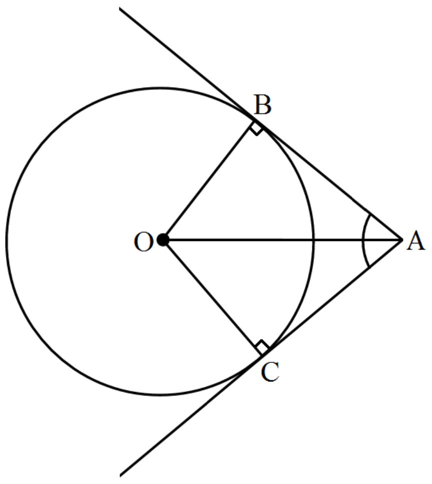
**Q41.** Each question consists of two statements, namely, Assertion (A) and Reason (R). for selecting the correct answer, use the following code: **1 Mark**

| Assertion (A) | Reason (R) |
|---|---|
| If two tangent are drawn to a circle from an external point then they subtend equal angles at the centre. | A parallelogram circumscribing a circle is a rhombus. |

**A** Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A).
**B** Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct explanation of Assertion (A).
**C** Assertion (A) is true and Reason (R) is false.
**D** Assertion (A) is false and Reason (R)is true.

**Ans: B** Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct explanation of Assertion (A).

**Solution:**




Consider tangent AB and AC drawn to the circle with centre O.
In ? ? △OBA and ? ? △OCA,
AO = AO ....(common side)
OB = OC .....(radii of the same circle)
$\angle B = \angle C = 90°$
$\Rightarrow \triangle OBA \cong \triangle OCA$ ....(RHS congruence criterion)
So, $\angle OBA = \angle COA$ ....(cpct)
Thus, the (R) is also true and can be proved using the property, 'tangent from an external point to a circle are equal'
But, the Reason (R) is not the correct explanation for the Assertion (A).

**Q42. Directions:** In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as: **1 Mark**
**Assertion:** The secant of circle is perpendicular to the radius of the circle.
**Reason:** A line that intersects the given circle in two points is called a secant.

**A** Assertion and Reason both are correct statements and Reason is the correct explanation of Assertion.
**B** Assertion and Reason both are correct statements but Reason is not the correct explanation of Assertion.
**C** Assertion is correct statement but Reason is wrong statement.
**D** Assertion is wrong statement but Reason is correct statement.

**Ans: D** Assertion is wrong statement but Reason is correct statement.

**Solution:**
Assertion is wrong, as secant of circle is not perpendicular to the radius of circle.Reason is correct.

**Q43. Directions:** In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as: **1 Mark**
**Assertion:** At a point P of a circle with centre O and radius 12cm, a tangent PQ of length 16cm is drawn.Then, OQ = 20cm.
**Reason:** The tangent at any point of a circle is perpendicular to the radius through the point of contact.

**A** Assertion and Reason both are correct statements and Reason is the correct explanation of Assertion.
**B** Assertion and Reason both are correct statements but Reason is not the correct explanation of Assertion.
**C** Assertion is correct statement but Reason is wrong statement.
**D** Assertion is wrong statement but Reason is correct statement.

**Ans:** **A** Assertion and Reason both are correct statements and Reason is the correct explanation of Assertion.

**Solution:**

In $\triangle OPQ$, we have, $\angle OPQ = 90^\circ$

$\therefore OQ^2 = OP^2 + PQ^2 = (12)^2 + (16)^2$

$= (144 + 256) = 400$

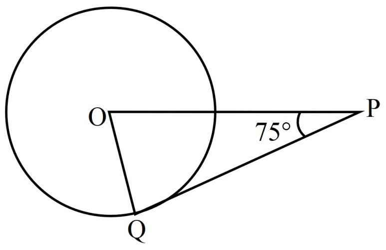
$\Rightarrow OQ = \sqrt{400}\text{cm} = 20\text{cm}$

Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.

**Q44.Directions:** In the following questions, a statement of assertion (A) is followed by a statement of reason (R). **1 Mark**

Mark the correct choice as:

**Assertion:** In the given figure, if PQ is a tangent to the circle with centre O, then the value of $\angle POQ$ is $25^\circ$




**Reason:** If two tangents are drawn to a circle from an external point, then they subtend equal angles at the centre

**A** Assertion and Reason both are correct statements and Reason is the correct explanation of Assertion.

**B** Assertion and Reason both are correct statements but Reason is not the correct explanation of Assertion.

**C** Assertion is correct statement but Reason is wrong statement.

**D** Assertion is wrong statement but Reason is correct statement.

**Ans:** **D** Assertion is wrong statement but Reason is correct statement.

**Solution:**

In $\triangle OQP$, $PQ \perp OQ$

[ $\because$ Tangent at any point of a circle is perpendicular to the radius through the point of contact]

$\therefore \angle OQP = 90^\circ$

Now, in $\triangle OQP$

$\angle OQP + \angle QPO + \angle POQ = 180^\circ$ [By angle sum property]

$\Rightarrow 90^\circ + 75^\circ + \angle POQ = 180^\circ$

$\Rightarrow POQ = 180^\circ - 165^\circ = 15^\circ$

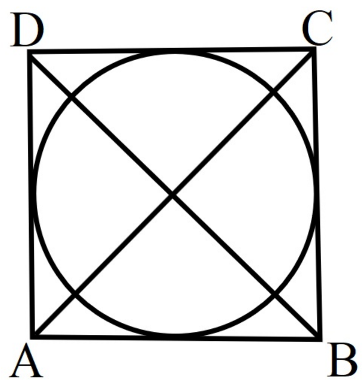
Assertion is wrong but Reason is correct.

**Q45.Directions:** In the following questions, a statement of assertion (A) is followed by a statement of reason (R). **1 Mark**

Mark the correct choice as:

**Assertion:** In the given figure, all the sides of a quadrilateral ABCD touch a circle with centre O. Then, $\angle AOB + \angle COD = 180^\circ$

**Reason:** The opposite sides of a quadrilateral circumscribing a circle does not subtend supplementary angles at the centre of the circle.




1. Assertion and Reason both are correct statements and Reason is the correct explanation of Assertion.
2. Assertion and Reason both are correct statements but Reason is not the correct explanation of Assertion.
3. Assertion is correct statement but Reason is wrong statement.
4. Assertion is wrong statement but Reason is correct statement.

**A** Assertion and Reason both are correct statements and Reason is the correct explanation of Assertion.

**B** Assertion and Reason both are correct statements but Reason is not the correct explanation of Assertion.

**C** Assertion is correct statement but Reason is wrong statement.

**D** Assertion is wrong statement but Reason is correct statement.

**Ans: C** Assertion is correct statement but Reason is wrong statement.

**Solution:**

We have a circle with R centre O.A quadrilateral ABCD is such that the sides AB, BC, CD and DA touch the circle at P, Q, R and S respectively.Let us join OP, OQ, QR and OS.

We know that two tangents drawn from an external point to a circle subtend equal angles at the centre.

$\therefore \angle 1 = \angle 2, \angle 3 = \angle 4$

$\angle 5 = \angle 6$ and $\angle 7 = \angle 8$

Also, the sum of all the angles around a point is $360^\circ$

$\therefore \angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 + \angle 7 + \angle 8 = 360^\circ$

$\Rightarrow 2[42 + 43 + 26 + 27] = 360^\circ$

$\Rightarrow (\angle 2 + \angle 3) + (\angle 6 + \angle 7) = 180^\circ$

Since, $\angle 2 + \angle 3 = \angle AOB$, $\angle 6 + \angle 7 = \angle COD$

$\angle AOB + \angle COD = 180^\circ$

$\therefore$ Assertion is correct and Reason is wrong.