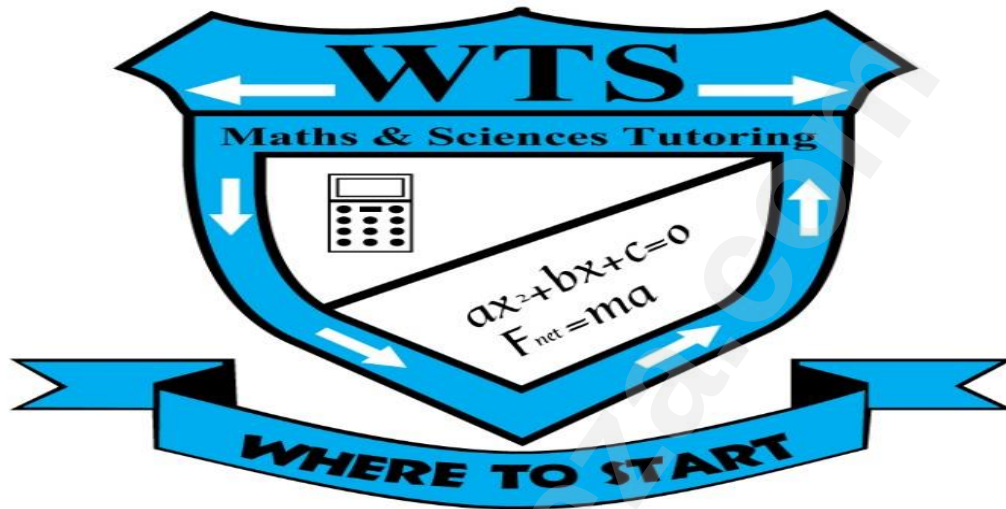




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GRADE : 11 AND 12

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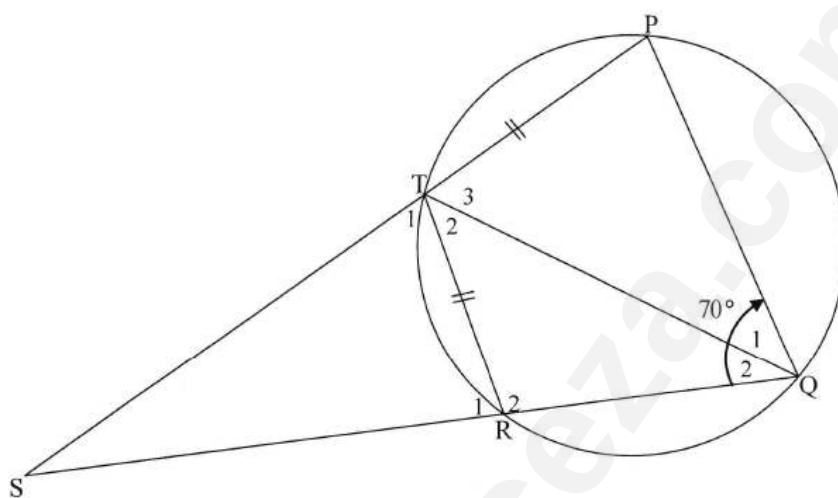
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PAST PAPERS

QUESTION 7

In the diagram, PQRT is a cyclic quadrilateral in a circle such that $PT = TR$. PT and QR are produced to meet in S. TQ is drawn. $\hat{SQP} = 70^\circ$



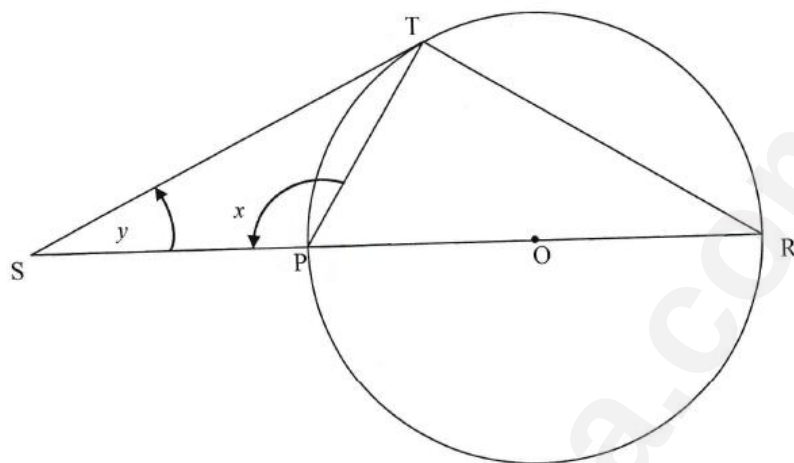
7.1 Calculate, with reasons, the size of:

7.1.1 $\hat{T}_1$ (2)

7.1.2 $\hat{Q}_1$ (2)

QUESTION 8

In the diagram, PR is a diameter of the circle with centre O . ST is a tangent to the circle at T and meets RP produced at S . $\angle SPT = x$ and $\angle S = y$.



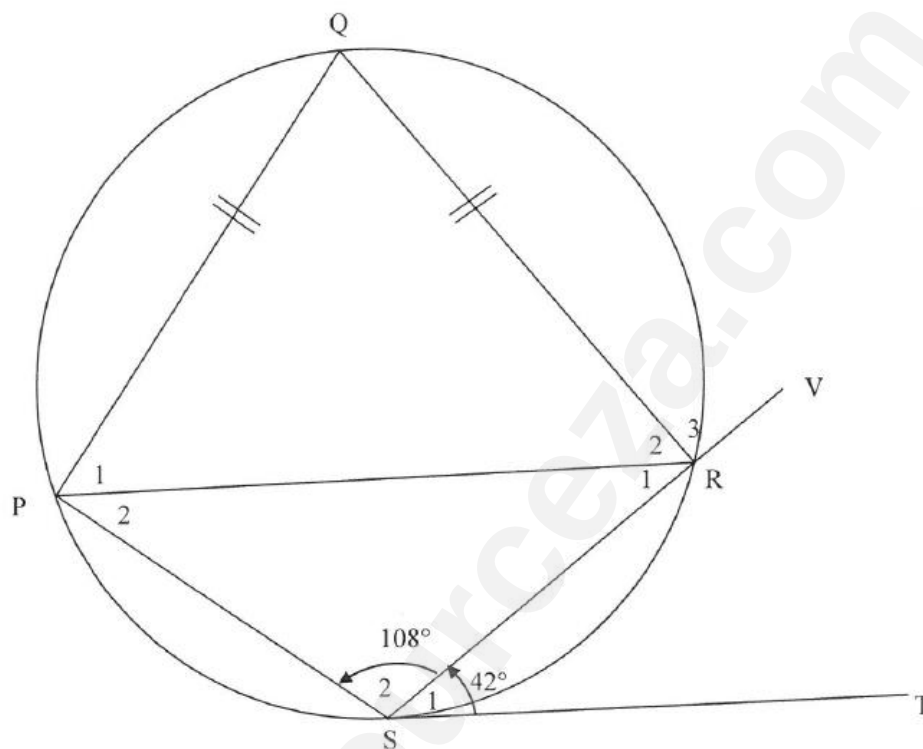
Determine, with reasons, y in terms of x .

[6]

Give reasons for ALL statements and calculations in QUESTIONS 8, 9, 10 and 11.

QUESTION 8

In the diagram, PQRS is a cyclic quadrilateral. ST is a tangent to the circle at S and chord SR is produced to V. $PQ = QR$, $\hat{S}_1 = 42^\circ$ and $\hat{S}_2 = 108^\circ$.



Determine, with reasons, the size of the following angles:

8.1 $\hat{Q}$ (2)

8.2 $\hat{R}_2$ (2)

8.3 $\hat{P}_2$ (2)

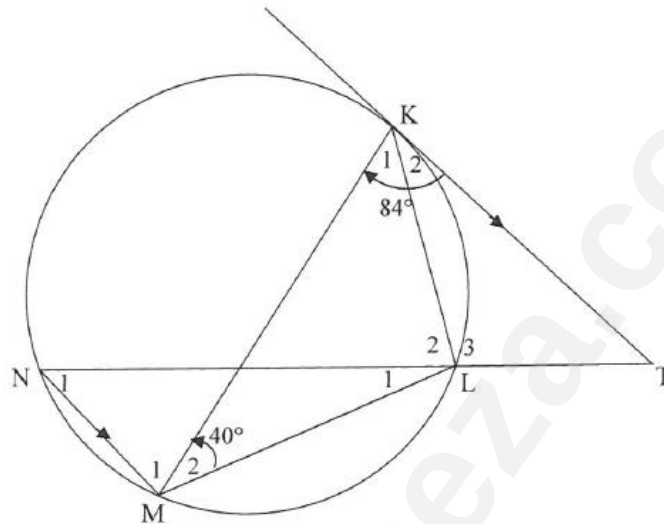
8.4 $\hat{R}_3$ (2)

[8]

Give reasons for ALL statements in QUESTIONS 8, 9 and 10.

QUESTION 8

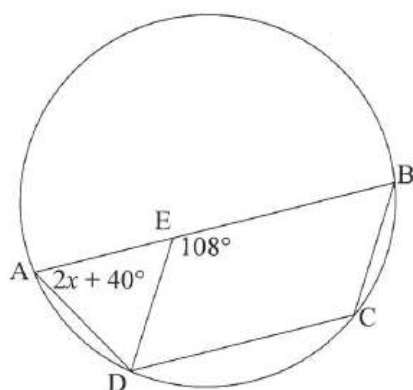
- 8.1 In the diagram below, tangent KT to the circle at K is parallel to the chord NM . NT cuts the circle at L . $\triangle KML$ is drawn. $\hat{M}_2 = 40^\circ$ and $\hat{M}\hat{K}T = 84^\circ$.



Determine, giving reasons, the size of:

- | | | |
|-------|-------------|-----|
| 8.1.1 | $\hat{K}_2$ | (2) |
| 8.1.2 | $\hat{N}_1$ | (3) |
| 8.1.3 | $\hat{T}$ | (2) |
| 8.1.4 | $\hat{L}_2$ | (2) |
| 8.1.5 | $\hat{L}_1$ | (1) |

- 8.2 In the diagram below, AB and DC are chords of a circle. E is a point on AB such that $BCDE$ is a parallelogram. $\angle DEB = 108^\circ$ and $\angle DAE = 2x + 40^\circ$.



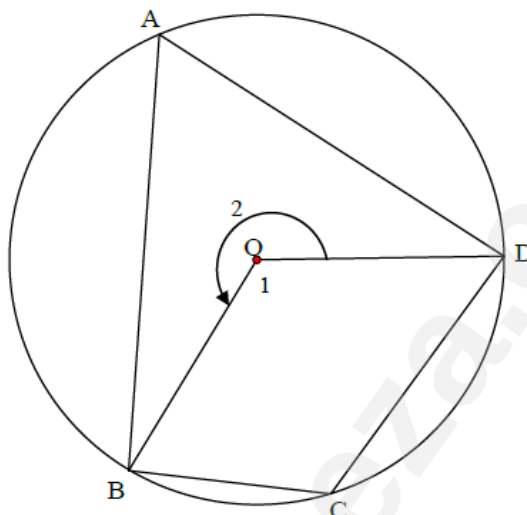
Calculate, giving reasons, the value of x .

(5)
[15]

Give reasons for ALL statements in QUESTIONS 8, 9, 10 and 11.

QUESTION 8

8.1 In the diagram below, cyclic quadrilateral ABCD is drawn in the circle with centre O.



8.1.1 Complete the following statement:

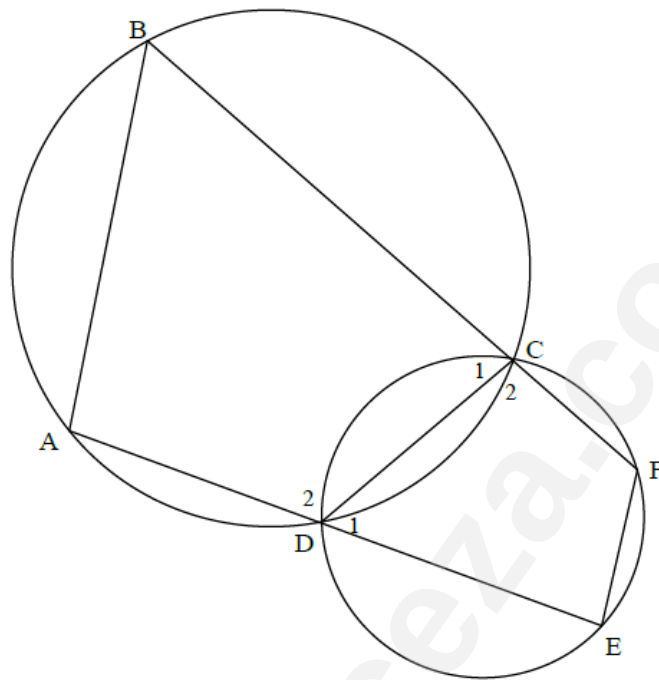
The angle subtended by a chord at the centre of a circle is ... the angle subtended by the same chord at the circumference of the circle.

(1)

8.1.2 Use QUESTION 8.1.1 to prove that $\hat{A} + \hat{C} = 180^\circ$.

(3)

- 8.2 In the diagram below, CD is a common chord of the two circles. Straight lines ADE and BCF are drawn. Chords AB and EF are drawn.

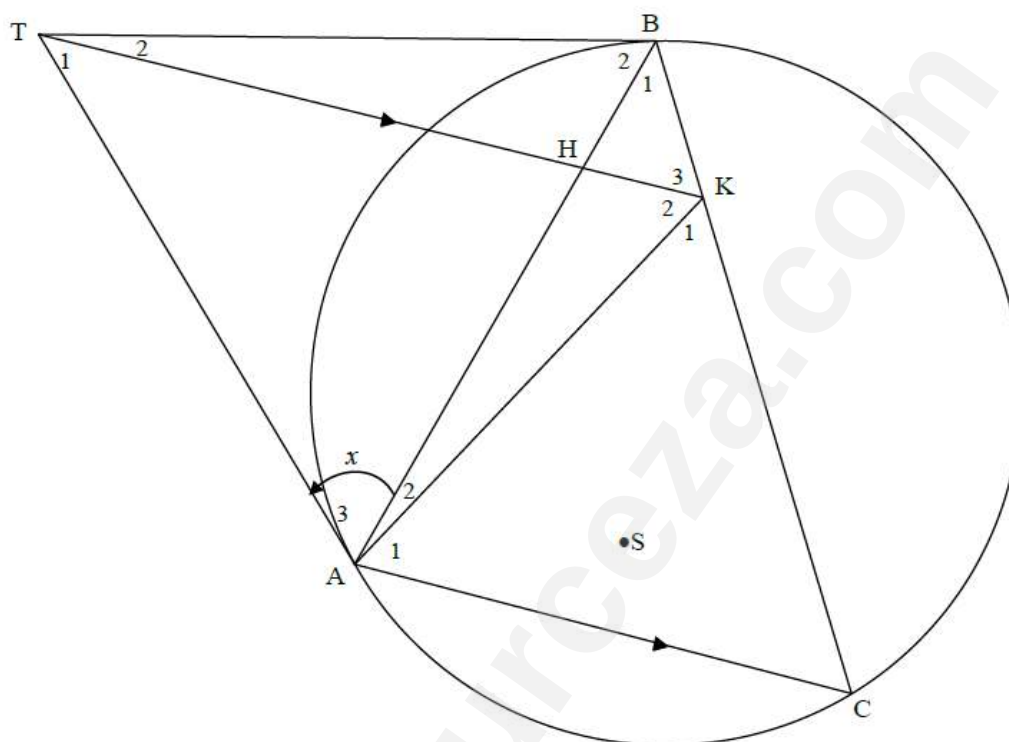


Prove that $EF \parallel AB$.

(5)
[9]

QUESTION 9

In the diagram below, $\triangle ABC$ is drawn in the circle. TA and TB are tangents to the circle. The straight line THK is parallel to AC with H on BA and K on BC . AK is drawn. Let $\hat{A}_3 = x$.

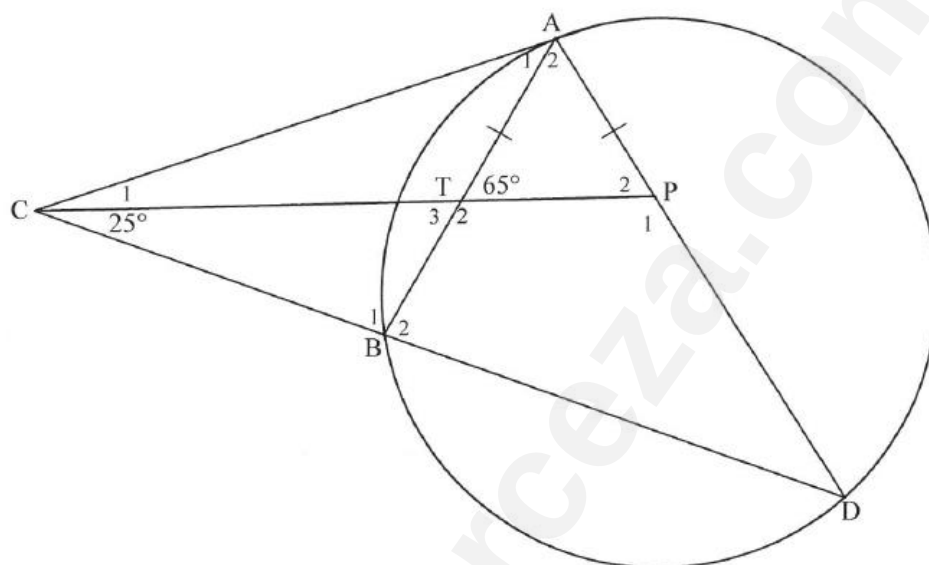


- 9.1 Prove that $\hat{K}_3 = x$. (4)
- 9.2 Prove that $AKBT$ is a cyclic quadrilateral. (2)
- 9.3 Prove that TK bisects $\hat{AKB}$. (4)
- 9.4 Prove that TA is a tangent to the circle passing through the points A , K and H . (2)
- 9.5 S is a point in the circle such that the points A , S , K and B are concyclic. Explain why A , S , B and T are also concyclic. (2)
- [14]**

Give reasons for ALL statements in QUESTIONS 8, 9, 10 and 11.

QUESTION 8

In the diagram $\triangle ACD$ is drawn with points A and D on the circumference of a circle. CD cuts the circle at B . P is a point on AD with CP the bisector of $\hat{ACD}$. CP cuts the chord AB at T . $AT = AP$, $\hat{ATP} = 65^\circ$ and $\hat{PCD} = 25^\circ$.



8.1 Determine the size of each of the following:

8.1.1 $\hat{P}_2$ (2)

8.1.2 $\hat{D}$ (2)

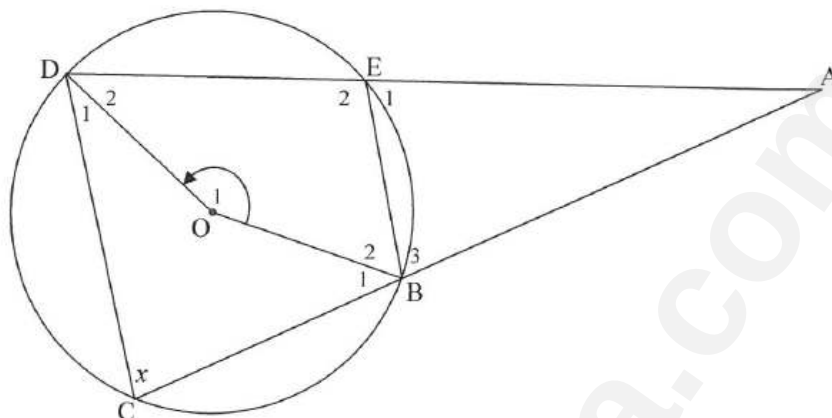
8.1.3 $\hat{A}_1$ (2)

8.2 Is CA a tangent to the circle ABD ? Motivate your answer. (2)

[8]

QUESTION 9

In the diagram O is the centre of the circle and BO and OD are drawn. Chords CB and DE are produced to meet in A . Chords BE and CD are drawn. $\hat{BCD} = x$.



- 9.1 Give the reason for each of the statements in the table. Complete the table provided in the ANSWER BOOK by writing down the reason for each statement. (2)

Statement		Reason
9.1.1	$\hat{E}_1 = x$	
9.1.2	$\hat{O}_1 = 2x$	

- 9.2 If it is given that $BE \parallel CD$, prove that:

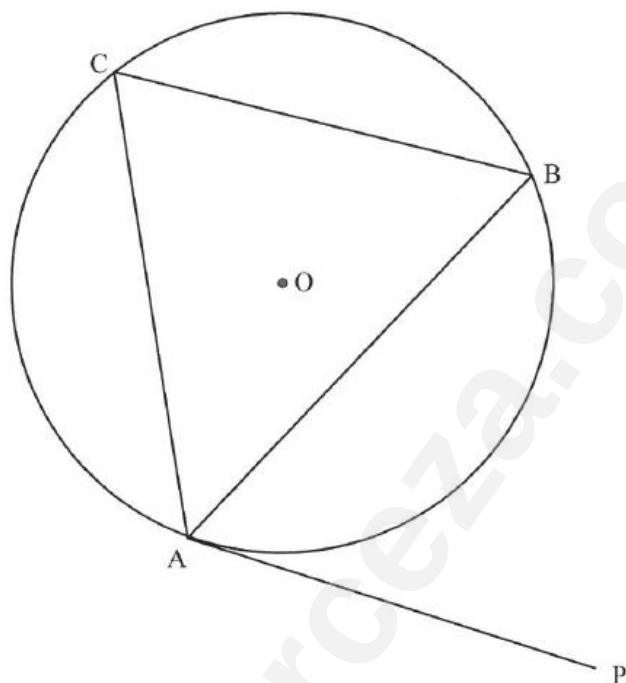
9.2.1 $AC = AD$ (4)

9.2.2 $ABOD$ is a cyclic quadrilateral (3)

[9]

QUESTION 11

- 11.1 In the diagram O is the centre of the circle and PA is a tangent to the circle at A . B and C are points on the circumference of the circle.



Use the diagram to prove the theorem that states that $\hat{BAP} = \hat{ACB}$.

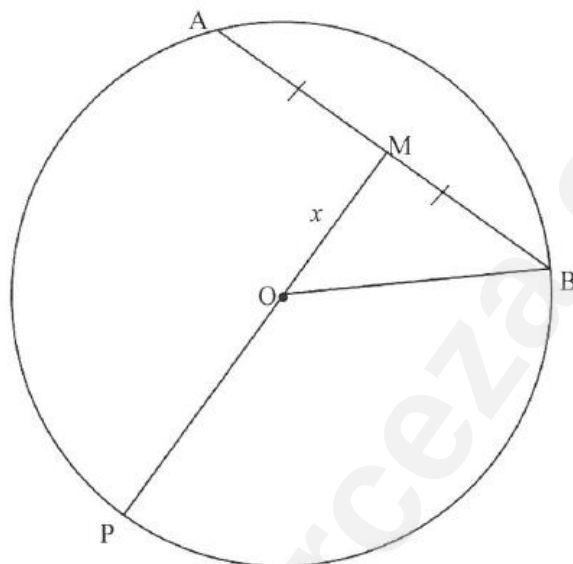
(6)

GIVE REASONS FOR YOUR ANSWERS IN QUESTIONS 7, 8, 9 AND 10.

QUESTION 7

In the diagram, AB is a chord of the circle with centre O. M is the midpoint of AB. MO is produced to P, where P is a point on the circle. $OM = x$ units, $AB = 20$ units

and $\frac{PM}{OM} = \frac{5}{2}$.



- 7.1 Write down the length of MB. (1)
- 7.2 Give a reason why $OM \perp AB$. (1)
- 7.3 Show that $OP = \frac{3x}{2}$ units. (2)
- 7.4 Calculate the value of x . (3)
- [7]

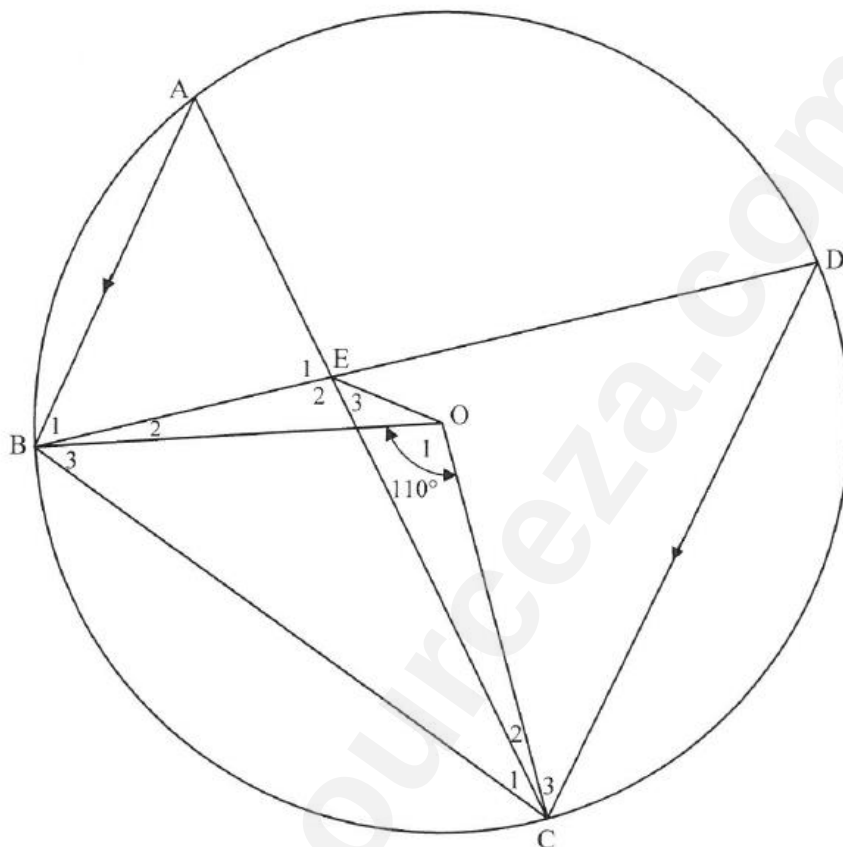
QUESTION 8

In the diagram below, the circle with centre O passes through A , B , C and D .

$AB \parallel DC$ and $\hat{BOC} = 110^\circ$.

The chords AC and BD intersect at E .

EO , BO , CO and BC are joined.



8.1 Calculate the size of the following angles, giving reasons for your answers:

8.1.1 $\hat{D}$ (2)

8.1.2 $\hat{A}$ (2)

8.1.3 $\hat{E}_2$ (4)

8.2 Prove that $BEOC$ is a cyclic quadrilateral. (2)
[10]

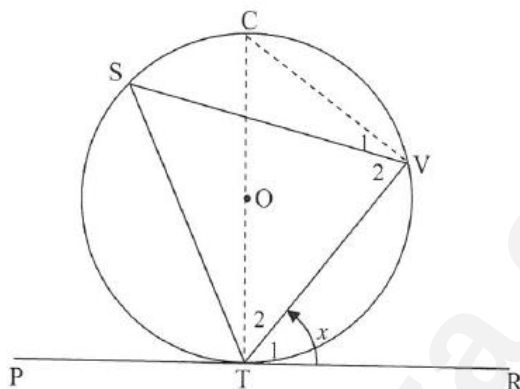
QUESTION 9

- 9.1 Complete the statement of the following theorem:

The exterior angle of a cyclic quadrilateral is equal to ...

(1)

- 9.2 In the diagram below the circle with centre O passes through points S , T and V . PR is a tangent to the circle at T . VS , ST and VT are joined.



Given below is the partially completed proof of the theorem that states that $\hat{VTR} = \hat{S}$. Using the above diagram, complete the proof of the theorem on DIAGRAM SHEET 3.

Construction: Draw diameter TC and join CV .

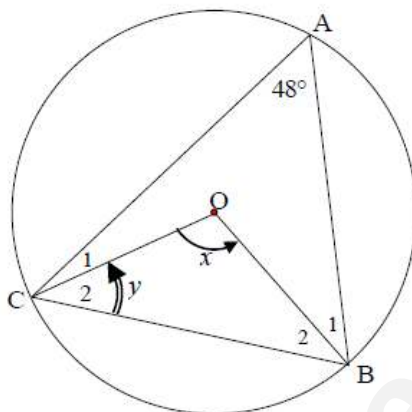
Statement	Reason
Let: $\hat{VTR} = \hat{T}_1 = x$	
$\hat{V}_1 + \hat{V}_2 = \dots\dots\dots$	$\dots\dots\dots$
$\hat{T}_2 = 90^\circ - x$	$\dots\dots\dots$
$\therefore \hat{C} = \dots\dots\dots$	Sum of the angles of a triangle
$\therefore \hat{S} = x$	$\dots\dots\dots$
$\therefore \hat{VTR} = \hat{S}$	

(5)

GIVE REASONS FOR YOUR STATEMENTS IN QUESTIONS 8, 9 AND 10.

QUESTION 8

- 8.1 In the diagram, O is the centre of the circle passing through A, B and C.
 $\hat{CAB} = 48^\circ$, $\hat{COB} = x$ and $\hat{C}_2 = y$.

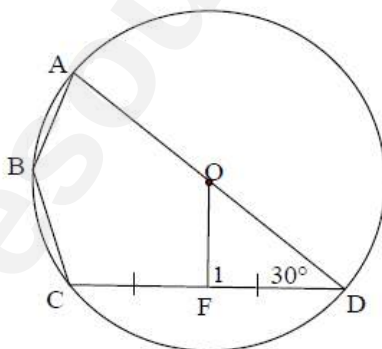


Determine, with reasons, the size of:

8.1.1 x (2)

8.1.2 y (2)

- 8.2 In the diagram, O is the centre of the circle passing through A, B, C and D.
 AOD is a straight line and F is the midpoint of chord CD. $\hat{ODF} = 30^\circ$ and OF are joined.

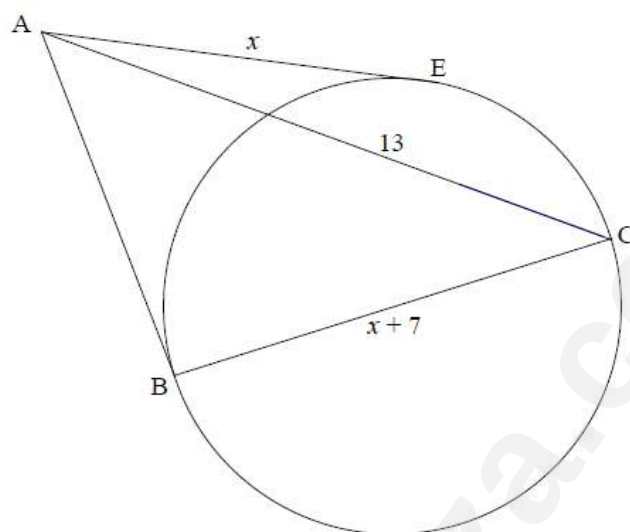


Determine, with reasons, the size of:

8.2.1 $\hat{F}_1$ (2)

8.2.2 $\hat{ABC}$ (2)

- 8.3 In the diagram, AB and AE are tangents to the circle at B and E respectively. BC is a diameter of the circle. $AC = 13$, $AE = x$ and $BC = x + 7$.



- 8.3.1 Give reasons for the statements below.
Complete the table on **DIAGRAM SHEET 3**.

	Statement	Reason
(a)	$\hat{ABC} = 90^\circ$	
(b)	$AB = x$	

(2)

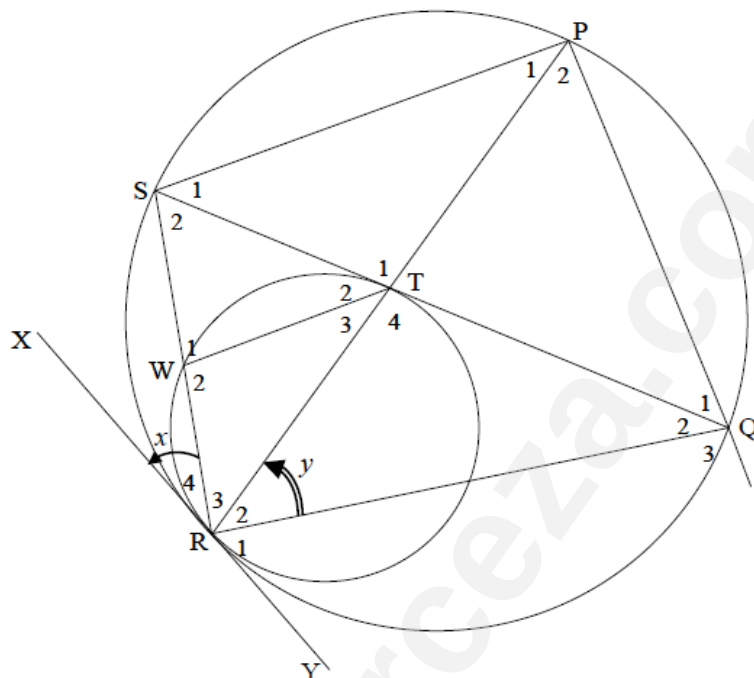
- 8.3.2 Calculate the length of AB.

(4)
[14]

QUESTION 10

The two circles in the diagram have a common tangent XRY at R . W is any point on the small circle. The straight line RWS meets the large circle at S . The chord STQ is a tangent to the small circle, where T is the point of contact. Chord RTP is drawn.

Let $\hat{R}_4 = x$ and $\hat{R}_2 = y$



- 10.1 Give reasons for the statements below.
Complete the table on **DIAGRAM SHEET 6**.

Let $\hat{R}_4 = x$ and $\hat{R}_2 = y$		
	Statement	Reason
10.1.1	$\hat{T}_3 = x$	
10.1.2	$\hat{P}_1 = x$	
10.1.3	$WT \parallel SP$	
10.1.4	$\hat{S}_1 = y$	
10.1.5	$\hat{T}_2 = y$	

(5)

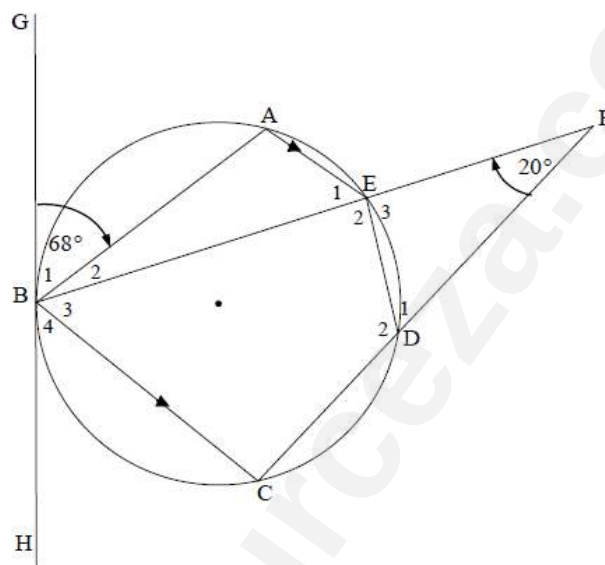
Give reasons for your statements in QUESTIONS 8, 9 and 10.

QUESTION 8

8.1 Complete the following statement:

The angle between the tangent and the chord at the point of contact is equal to ... (1)

8.2 In the diagram, A, B, C, D and E are points on the circumference of the circle such that $AE \parallel BC$. BE and CD produced meet in F. GBH is a tangent to the circle at B. $\hat{B}_1 = 68^\circ$ and $\hat{F} = 20^\circ$.



Determine the size of each of the following:

8.2.1 $\hat{E}_1$ (2)

8.2.2 $\hat{B}_3$ (1)

8.2.3 $\hat{D}_1$ (2)

8.2.4 $\hat{E}_2$ (1)

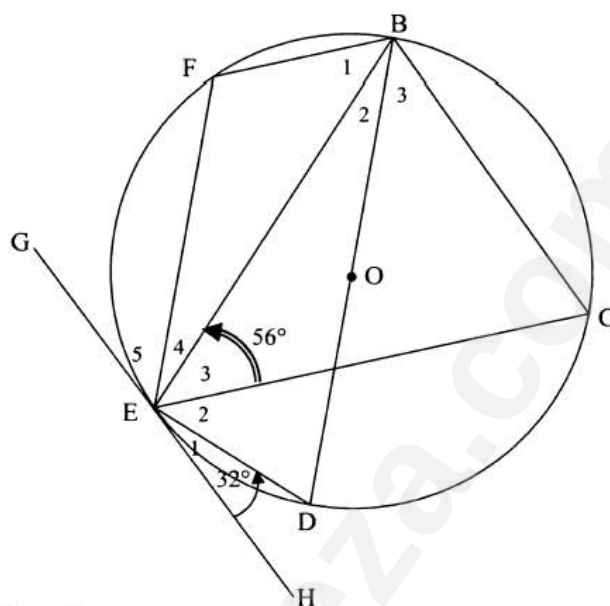
8.2.5 $\hat{C}$ (2)

[9]

QUESTION 10

In the diagram below, O is the centre of the circle. BD is a diameter of the circle. GEH is a tangent to the circle at E. F and C are two points on the circle and FB, FE, BC, CE and BE are drawn.

$$\hat{E}_1 = 32^\circ \text{ and } \hat{E}_3 = 56^\circ.$$



Calculate, with reasons, the values of:

10.1 $\hat{E}_2$ (2)

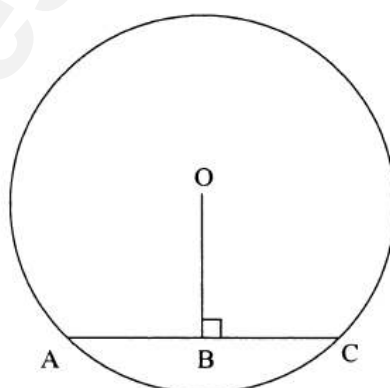
10.2 $\hat{E}\hat{B}\hat{C}$ (3)

10.3 $\hat{F}$ (4)
[9]

QUESTION 11

In the diagram below, O is the centre of the circle and OB is perpendicular to the chord AC.

Prove, using Euclidean geometry methods, the theorem that states $AB = BC$.



[5]

QUESTION 8

8.1 Complete the following statement:

The angle between the tangent and the chord is equal ...

(1)

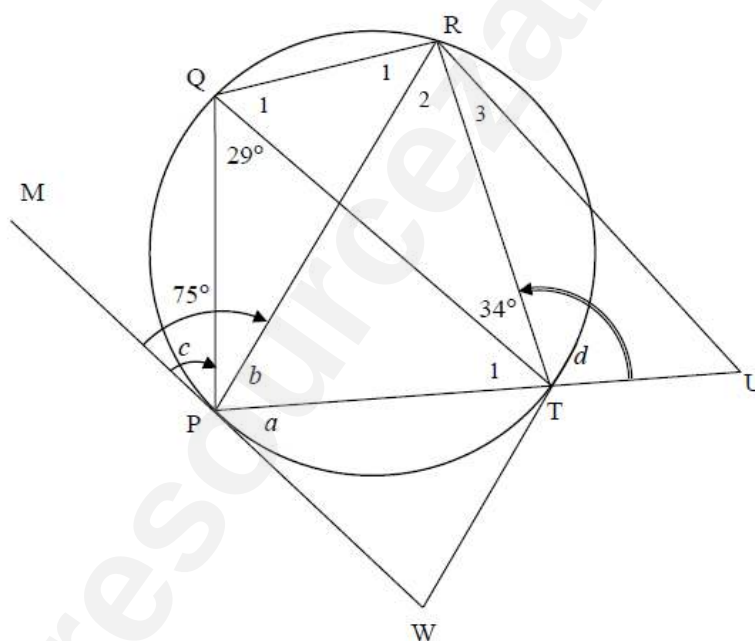
8.2 In the diagram points P, Q, R and T lie on the circumference of a circle. MW and TW are tangents to the circle at P and T respectively. PT is produced to meet RU at U.

$$\hat{MPR} = 75^\circ$$

$$\hat{PQT} = 29^\circ$$

$$\hat{QTR} = 34^\circ$$

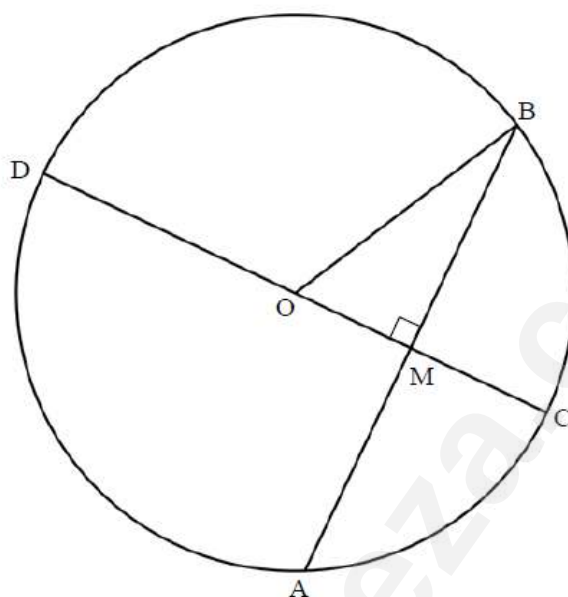
Let $\hat{TPW} = a$, $\hat{RPT} = b$, $\hat{MPQ} = c$ and $\hat{RTU} = d$, calculate the values of a , b , c and d .



(9)
[10]

QUESTION 10

In the diagram below, O is the centre of the circle. Chord AB is perpendicular to diameter DC. $CM : MD = 4 : 9$ and $AB = 24$ units.



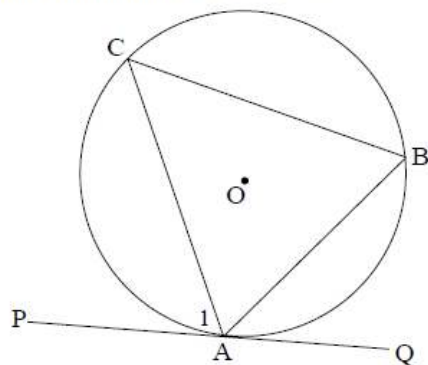
- 10.1 Determine an expression for DC in terms of x if $CM = 4x$ units. (1)
- 10.2 Determine an expression for OM in terms of x . (2)
- 10.3 Hence, or otherwise, calculate the length of the radius. (4)
- [7]

In the next FOUR questions, ensure you give reasons for each statement you make.

QUESTION 8

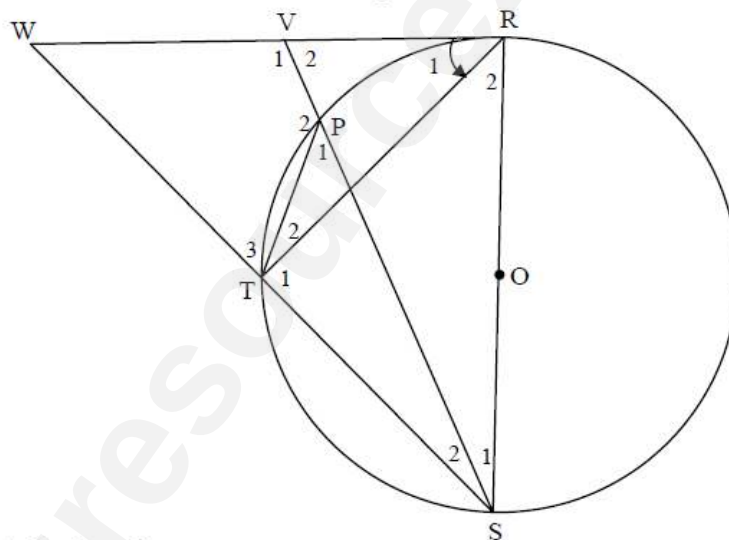
- 8.1 In the diagram below, O is the centre of the circle. PQ is a tangent to the circle at A . B and C are points on the circumference of the circle. AB , AC and BC are joined.

Prove the theorem that states $\hat{CAP} = \hat{ABC}$.



(5)

- 8.2 RS is a diameter of the circle with centre O . Chord ST is produced to W . Chord SP produced meets the tangent RW at V . $\hat{R}_1 = 50^\circ$.



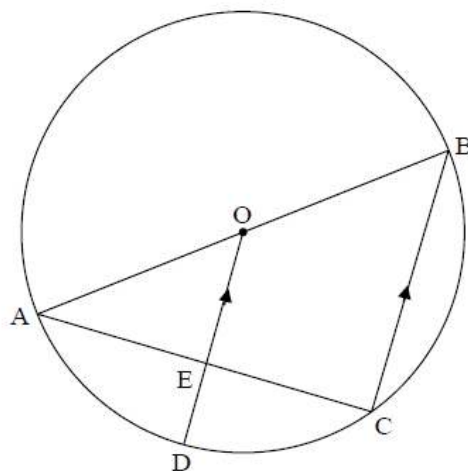
Calculate the size of:

- 8.2.1 $\hat{WRS}$ (1)
- 8.2.2 $\hat{W}$ (2)
- 8.2.3 $\hat{P}_1$ (3)
- 8.2.4 Prove that $\hat{V}_1 = \hat{PTS}$. (4)

[15]

QUESTION 9

AB is a diameter of the circle ABCD. OD is drawn parallel to BC and meets AC in E.

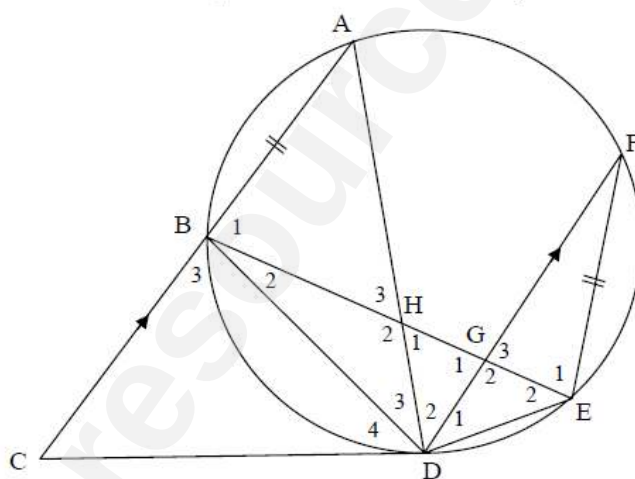


If the radius is 10 cm and $AC = 16$ cm, calculate the length of ED.

[5]

QUESTION 10

CD is a tangent to circle ABDEF at D. Chord AB is produced to C. Chord BE cuts chord AD in H and chord FD in G. $AC \parallel FD$ and $FE = AB$. Let $\hat{D}_4 = x$ and $\hat{D}_1 = y$.

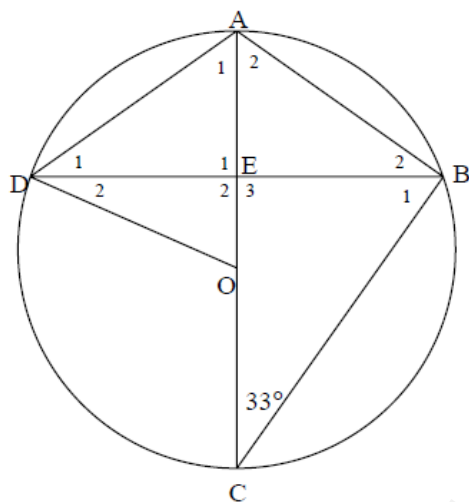


10.1 Determine THREE other angles that are each equal to x .

(6)

QUESTION 7

In the diagram below AC is a diameter of the circle with centre O. AC and chord BD intersect at E. AB, BC and AD are also chords of the circle. OD is joined. $AE \perp BD$.



If $\hat{C} = 33^\circ$, calculate, with reasons, the size of:

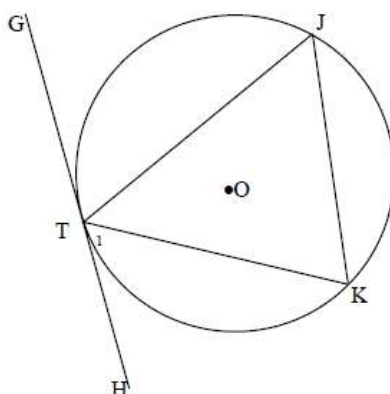
7.1 $\hat{A}_1$ (3)

7.2 $\hat{D}_2$ (2)

7.3 Show that AE bisects $\hat{DAB}$ (3)
[8]

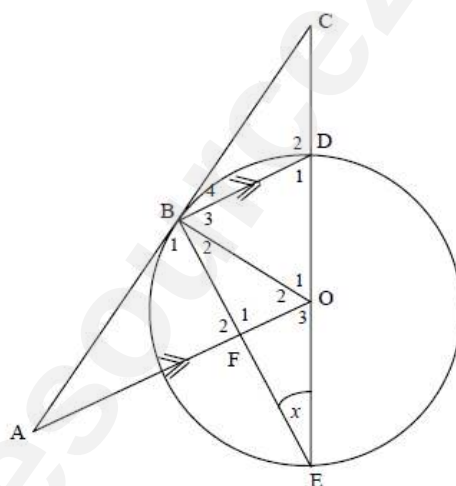
QUESTION 8

- 8.1 In the diagram below O is the centre of the circle. GH is a tangent to the circle at T. J and K are points on the circumference of the circle. TJ, TK and JK are joined.



Prove the theorem that states $\hat{T}_1 = \hat{TJK}$. (5)

- 8.2 ED is a diameter of the circle, with centre O. ED is extended to C. CA is a tangent to the circle at B. AO intersects BE at F. $BD \parallel AO$. $\hat{E} = x$.

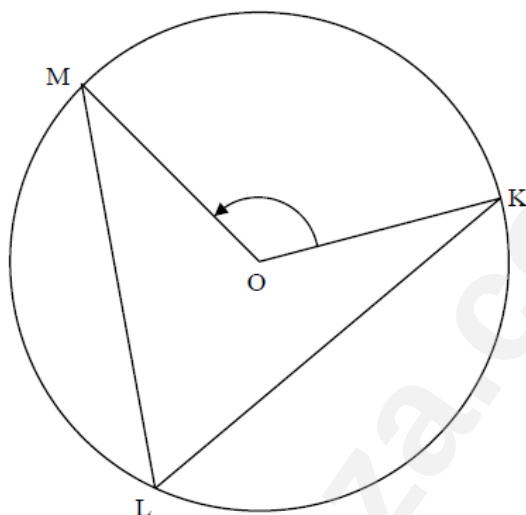


- 8.2.1 Write down, with reasons, THREE other angles equal to x . (4)

- 8.2.2 Determine, with reasons, $\hat{CBE}$ in terms of x . (3)

QUESTION 8

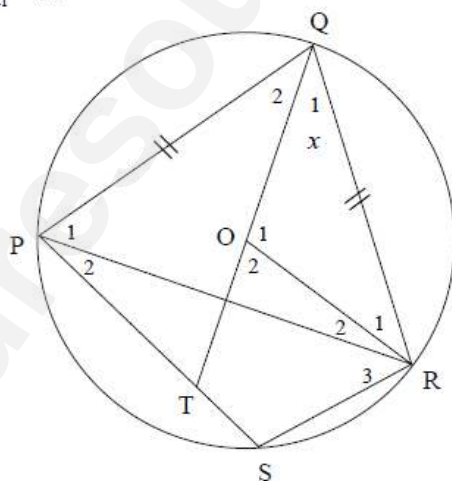
- 8.1 In the diagram below, O is the centre of the circle. K, L and M are points on the circumference of the circle.



Prove that the obtuse angle at O, $\hat{KÔM} = 2\hat{KLM}$.

(6)

- 8.2 In the diagram below, O is the centre of the circle. P, Q, R and S are points on the circumference of the circle. TOQ is a straight line such that T lies on PS. $PQ = QR$ and $\hat{Q}_1 = x$.



- 8.2.1 Calculate, with reasons, $\hat{P}_1$ in terms of x .

(3)

- 8.2.2 Show that TQ bisects $\hat{PQR}$.

(3)

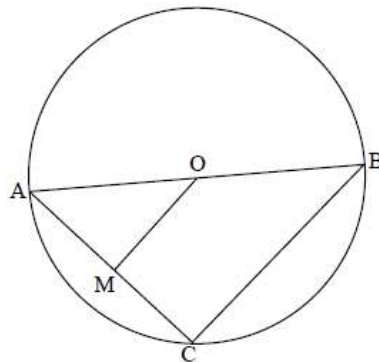
- 8.2.3 Show that STOR is a cyclic quadrilateral.

(3)

[15]

QUESTION 9

O is the centre of the circle below. $OM \perp AC$. The radius of the circle is equal to 5 cm and $BC = 8$ cm.



- 9.1 Write down the size of $\hat{BCA}$. (1)
- 9.2 Calculate: (3)
- 9.2.1 The length of AM, with reasons (3)
- 9.2.2 Area $\triangle AOM$: Area $\triangle ABC$ (3)

QUESTION 7

7.1 Complete the statements below by filling in the missing word(s) so that the statements are CORRECT:

7.1.1 The angle subtended by a chord at the centre of a circle is (1)

7.1.2 The angle between the tangent and a chord is (1)

7.1.3 The opposite angles of a cyclic quadrilateral are (1)

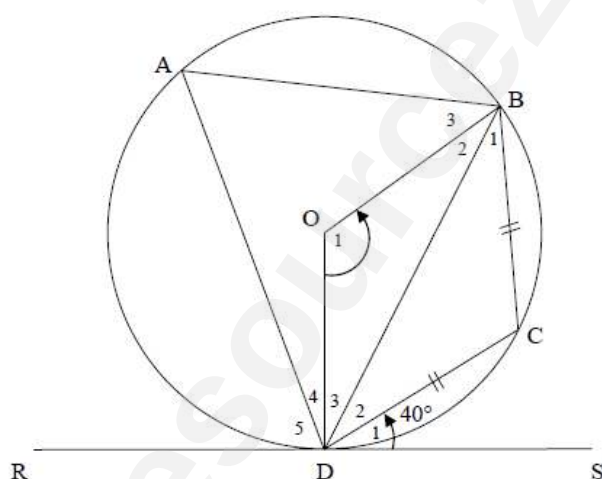
7.2 In the figure below, RDS is a tangent to circle O at D. If $BC = DC$ and $\hat{CDS} = 40^\circ$, calculate, with reasons, the measures of:

7.2.1 $\hat{BDC}$ (2)

7.2.2 $\hat{C}$ (1)

7.2.3 $\hat{A}$ (1)

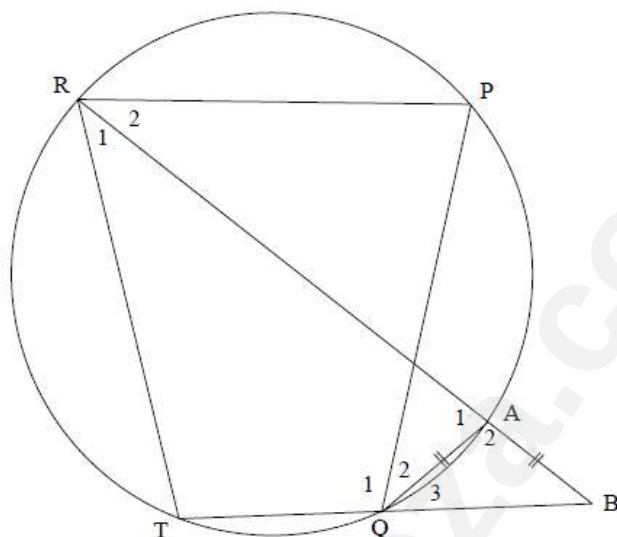
7.2.4 $\hat{O_1}$ (2)



[9]

QUESTION 8

In the diagram below, points R, P, A, Q and T lie on a circle. RA bisects $\hat{R}$ and $AB = AQ$. RA and TQ produced meet at B.



Prove that:

- 8.1 AQ bisects $\hat{PQB}$ (3)
- 8.2 $TR = TB$ (2)
- 8.3 $\hat{P} = \hat{TRP}$ (3)
- [8]

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- ✓ **GRADES** : 8 TO 12

WTS SATURDAY & SUNDAYS CLASSES

- ✓ **LEARNERS FROM DIFFERENT SCHOOLS ARE ALLOWED**
- ✓ **TIME** : 09:00 TO 12:00
- ✓ **SUBJECTS** : MATHS & SCIENCES

- ✓ VENUE : SIPHUMELELE SCHOOL [MZINGAZI RESERVE]
- ✓ GRADE 12 : SUNDAYS
- ✓ GRADE 10 & 11 : SATURDAYS

WEEKDAYS: PRIVATE CLASSES

- ✓ MONDAY TO THURSDAY
- ✓ TIME : 17:30 TO 19:00
- ✓ SUBJECTS : MATHS & SCIENCES

WTS FINISHING SCHOOL

- ✓ PLACE : KZN RICHARDS BAY @ MZINGAZI
- ✓ SUBJECTS : MATHS, PHYSICS, ACCOUNTING & LIFE SCIENCES
- ✓ TIME : 15:00 TO 16:30
- ✓ ACCOMMODATION IS AVAILABLE!!

ACKNOWLEDGEMENTS

- DEPARTMENT OF EDUCATION PAST PAPERS

ANY EDITIONS AND COMMENTS ARE ALLOWED

I THANK YOU!!!!!!!!!!!!!!

NB: WE CONDUCT CROSSNIGHTS AND CAMPS PER TERM

“WHERE TO START MATHS & SCIENCE IS FOR THE NATION”