



**Western Cape
Government**

Education

TELEMATICS TEACHING PROJECT

GRADE 11

MATHEMATICS WORKBOOK

2015

Term 4

Dear grade 11 Learner

In the 4th term the presenters will concentrate on ALL grade 11 theorems focusing on geometry problems:

The Grade 11 geometry entails the circle geometry theorems dealing with angles in a circle, cyclic quadrilaterals and tangents.

Your teacher should indicate to you exactly which theorems you have to study for examination purposes but no proofs of the inverses of these theorems will be examined.

This workbook provides the activities for these sessions. Please make sure that you bring this workbook along to each and every Telematics session.

At the start of each lesson, the presenters will provide you with a summary of the important concepts and together with you will work through the activities. You are encouraged to come prepared, have a pen and enough paper (ideally a hard cover exercise book) and your scientific calculator with you.

You are also encouraged to participate fully in each lesson by asking questions and working out the exercises, and where you are asked to do so, sms or e-mail your answers to the studio.

GOOD LUCK WITH THE SESSIONS!!!

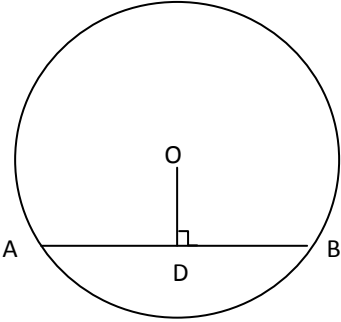
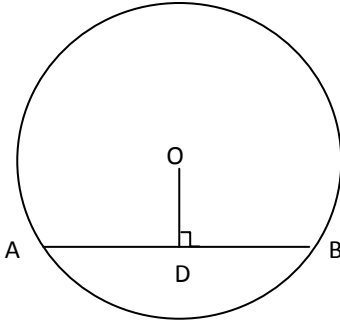
P. Tregonning

Schedule

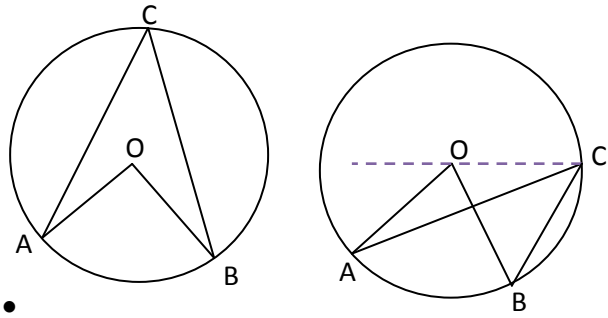
Date	Time	Subject	Topic
Monday, 19 October 2015	15:00 – 16:00	Mathematics	Euclidean (Circle) Geometry: Session 1
Thursday, 29 October 2015	15:00 – 16:00	Mathematics	Euclidean (Circle) Geometry: Session 2

Circle Geometry

THEOREMS:

Theorems	Diagram
<p>1. <i>The line drawn from the centre of the circle perpendicular to the chord bisects the chord.</i></p>	 <p>•</p>
<p>2. <i>The perpendicular bisector of a chord passes through the centre of a circle.</i></p>	 <p>•</p>

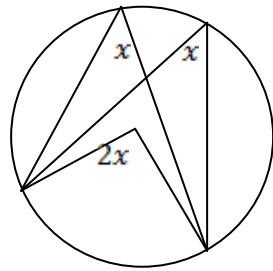
3. *The angle subtended by an arc at the centre of the circle is double the size of the angle subtended by the same arc at the circumference.*



•

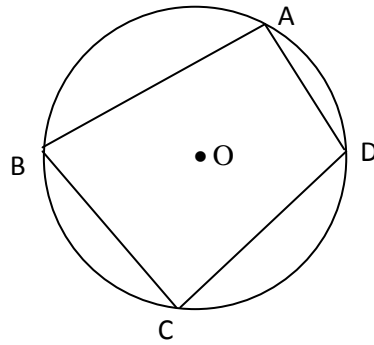
4. *Angles subtended by a chord of a circle, on the same side of the chord, are equal.*

• This theorem is directly based on the previous theorem

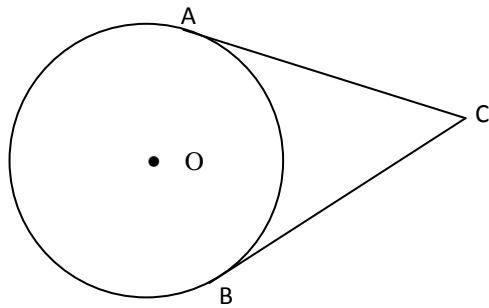


•

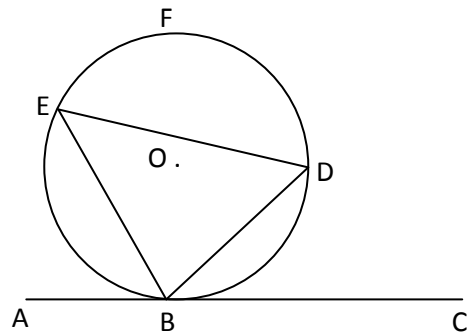
5. *The opposite angles of a cyclic quadrilateral are supplementary.*



6. *Two tangents drawn to a circle from the same point outside the circle are equal in length.*

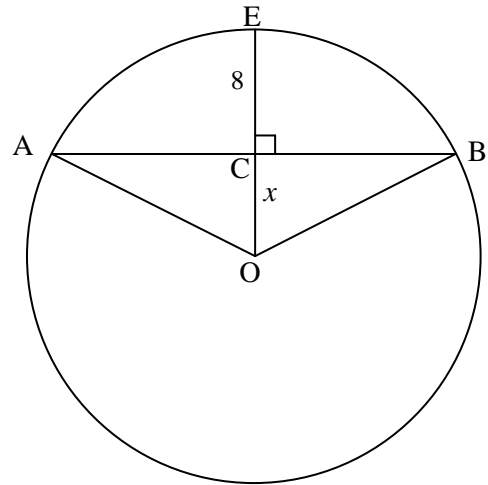


7. *The angle between the tangent to a circle and the chord drawn from the point of contact is equal to the angle in the alternate segment.*



QUESTIONS:

1. AB is the chord of the circle with centre O and is 24cm long. C is the midpoint of AB. $CE \perp AB$ cuts the circle at E.



1.1 $AC = \dots\dots\dots$ cm (1)

1.2 Calculate the value of x if $CE = 8$ cm. (5)

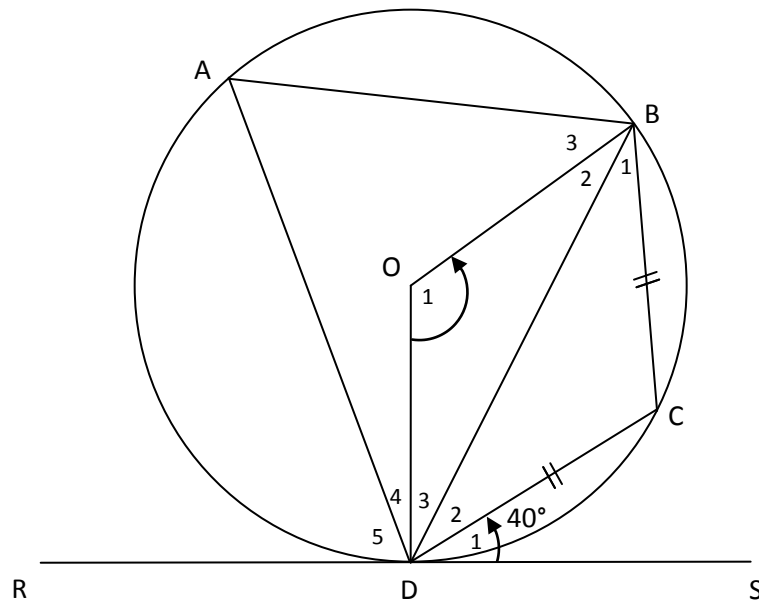
2. In the figure below, RDS is a tangent to circle O at D. If $BC = DC$ and $\hat{CDS} = 40^\circ$, calculate, with reasons, the measures of:

2.1 \hat{BDC} (2)

2.2 \hat{C} (1)

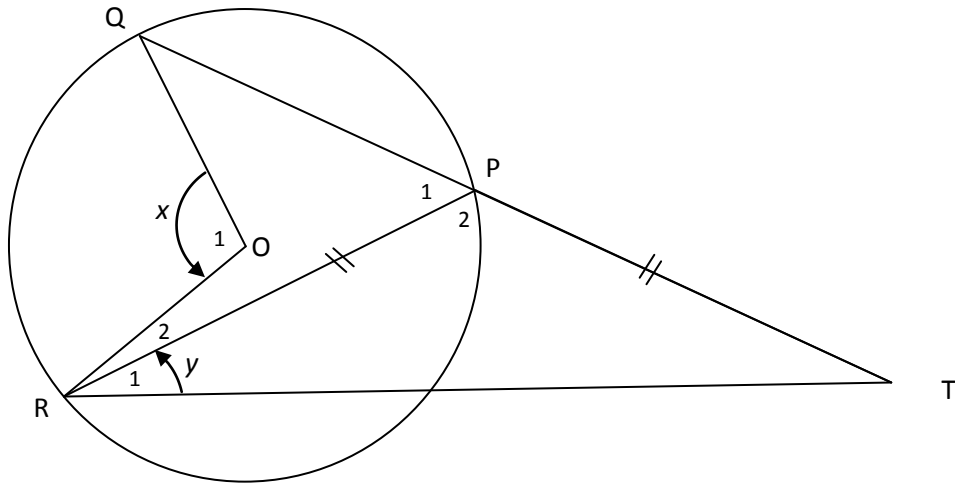
2.3 \hat{A} (1)

2.4 \hat{O}_1 (2)



3 In the figure below, O is the centre of the circle and $PT = PR$.

Let $\hat{R}_1 = y$ and $\hat{O}_1 = x$.



3.1 Express x in terms of y . (3)

3.2 If $TQ = TR$ and $x = 120^\circ$, calculate the measure of:

3.2.1 y (2)

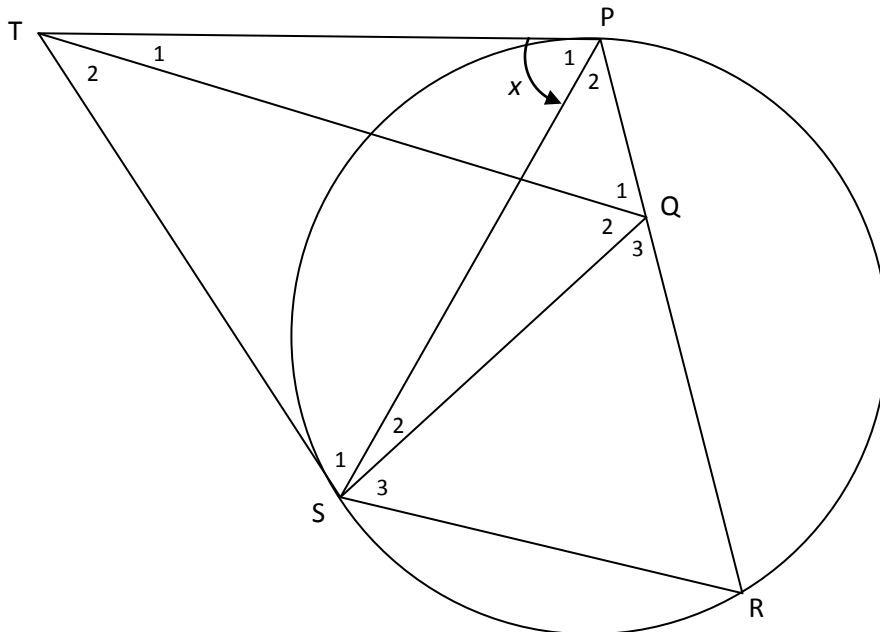
3.2.2 \hat{R}_2 (Hint: Draw QR) (3)

4. In the figure TP and TS are tangents to the given circle. R is a point on the circumference.

Q is a point on PR such that $\hat{Q}_1 = \hat{P}_1$.

SQ is drawn.

Let $\hat{P}_1 = x$.



Prove that:

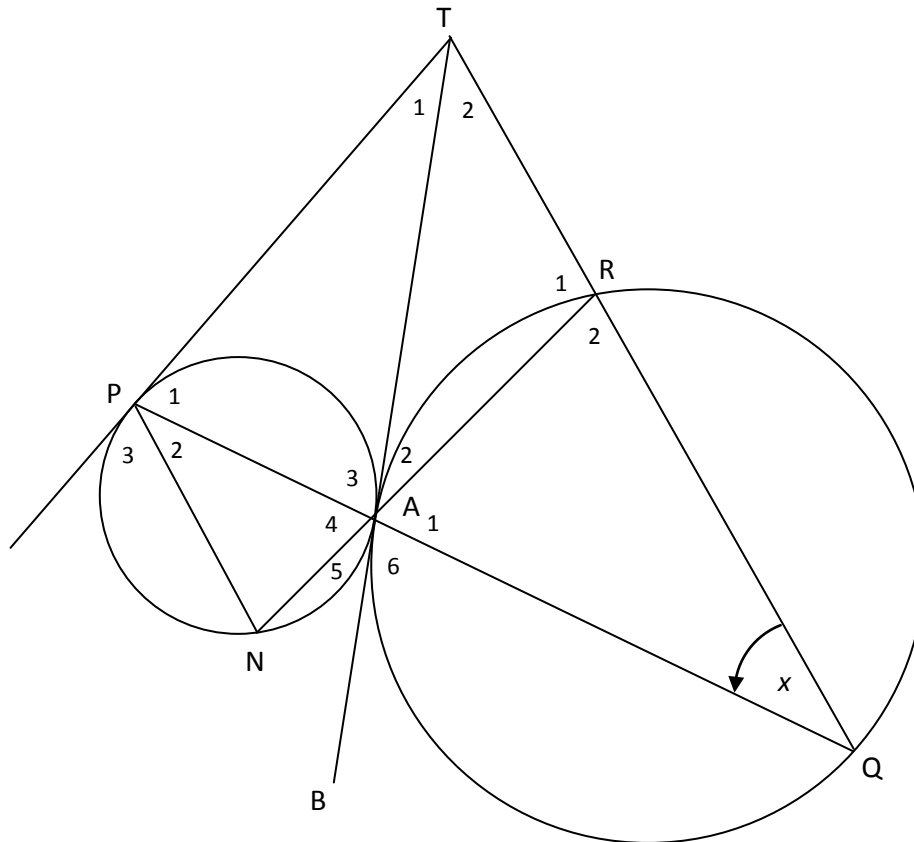
4.1 $TQ \parallel SR$ (4)

4.2 QPTS is a cyclic quadrilateral (4)

4.3 TQ bisects \hat{SQP} (3)

5. In the diagram below, two circles have a common tangent TAB. PT is a tangent to the smaller circle. PAQ, QRT and NAR are straight lines.

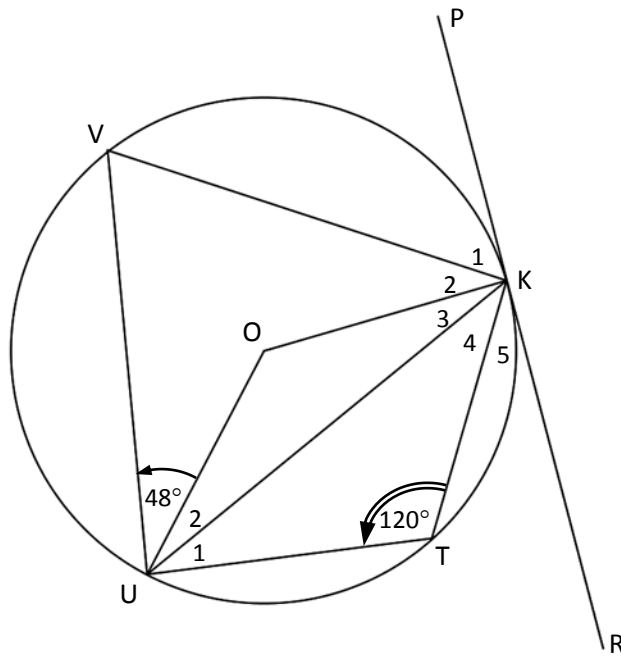
Let $\hat{Q} = x$.



5.1 Name, with reasons, THREE other angles equal to x . (5)

5.2 Prove that APTR is a cyclic quadrilateral. (5)

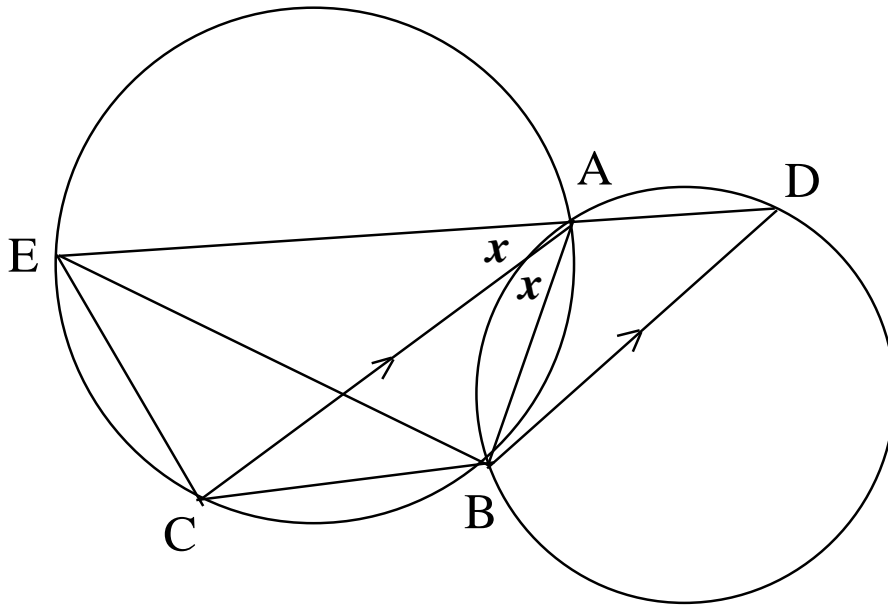
6. In the diagram below, O is the centre of the circle KTUV. PKR is a tangent to the circle at K. $\hat{O}UV = 48^\circ$ and $\hat{K}TU = 120^\circ$.



Calculate, with reasons, the sizes of the following angles:

- 6.1 \hat{V} (2)
- 6.2 $\hat{K}OU$ (2)
- 6.3 \hat{U}_2 (2)
- 6.4 \hat{K}_1 (2)
- 6.5 \hat{K}_2 (2)

7. Two circles meet in A and B. BD is a tangent to the larger circle and a chord of the smaller circle. DA produced meets the first circle in E. AC || DB with C a point on circle AEB.



- 7.1 If $\hat{EAC} = \hat{CAB} = x$, find, with reasons, SIX other angles equal to x . (12)
- 7.2 Prove that CA is a tangent to circle ABD. (2)
- 7.3 If $EA = EC$, prove that BE bisects \hat{CBA} (3)