


Name and Surname :

Grade/Class : 11/..... Mathematics Teacher :

Hudson Park High School



GRADE 11
MATHEMATICS
JUNE EXAMINATION PAPER 2

Marks :

100

Time : 2 Hours

Date : 3 June 2019

Exam : PHL

Moderator(s) : SLT, FRD.

INSTRUCTIONS

1. Illegible work, in the opinion of the marker, will earn zero marks.
2. Number your answers clearly and accurately, exactly as they appear on the question paper.
3. **NB** ◦ **START EACH QUESTION AT THE TOP OF A NEW PAGE.**
◦ **LEAVE 2 LINES OPEN BETWEEN EACH OF YOUR ANSWERS.**
4. **NB** Fill in the details requested on the front of the question paper and Answer Booklet.
Hand in your submission in the following manner :
 - Question paper (on top)
 - Answer pages in order (below).
5. Employ relevant formulae and show all working out. Answers alone may not be awarded full marks.
6. (Non-programmable and non-graphical) Calculators may be used, unless their usage is specifically prohibited.
7. Round off answers to 2 decimal places, where necessary, unless instructed otherwise.
8. If (Euclidean) Geometric statements are made, reasons must be stated appropriately.

QUESTION 1 [10 marks]

1. The following points have been scored by the Hudson Park High School rugby team in 12 matches.

11; 15; 17; 18; 20; 23; 28; 29; 35; 35; 35, 40

- 1.1 Calculate

1.1.1 Mean (2)

1.1.2 Mode (1)

1.1.3 Median (1)

1.1.4 interquartile range (3)

- 1.2 Represent the match points by means of box-and-whisker diagram. (3)

QUESTION 2 [7]

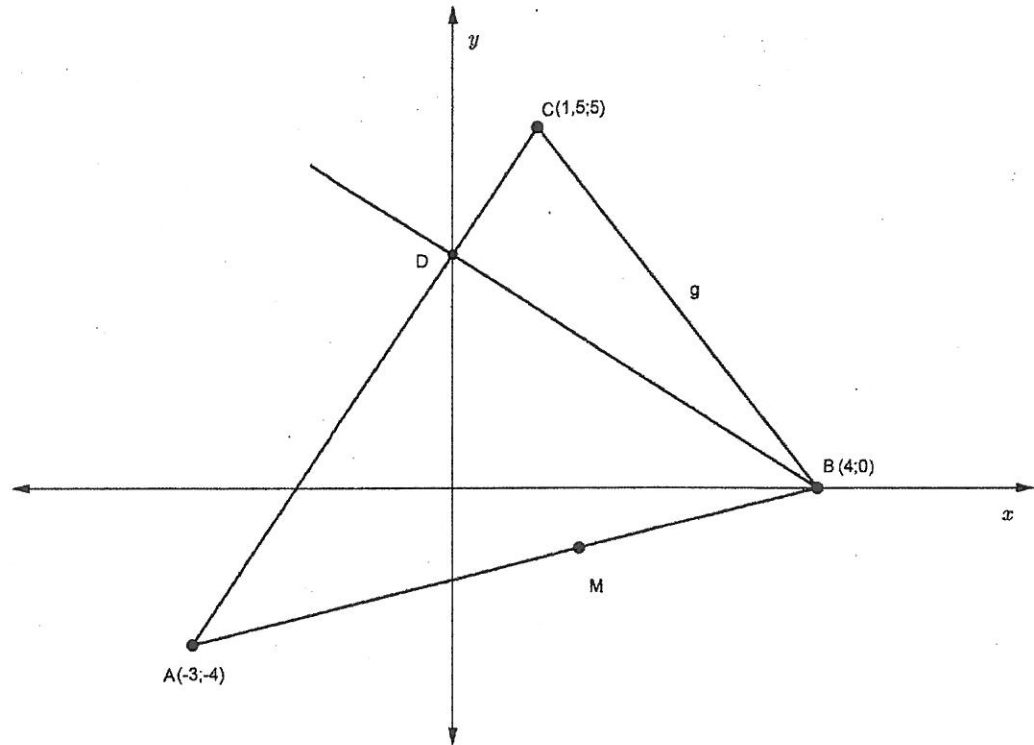
2. The following table represents the ages of tourists in a group.

Age	Frequency (f)
$20 \leq x < 30$	5
$30 \leq x < 40$	16
$40 \leq x < 50$	12
$50 \leq x < 60$	9
$60 \leq x < 70$	8

- 2.1 How many tourists were there in a group? (1)
- 2.2 Calculate the average age of the tourist. (4)
- 2.3 Determine the interval in which the seventh decile lies. (2)

QUESTION 3 [12]

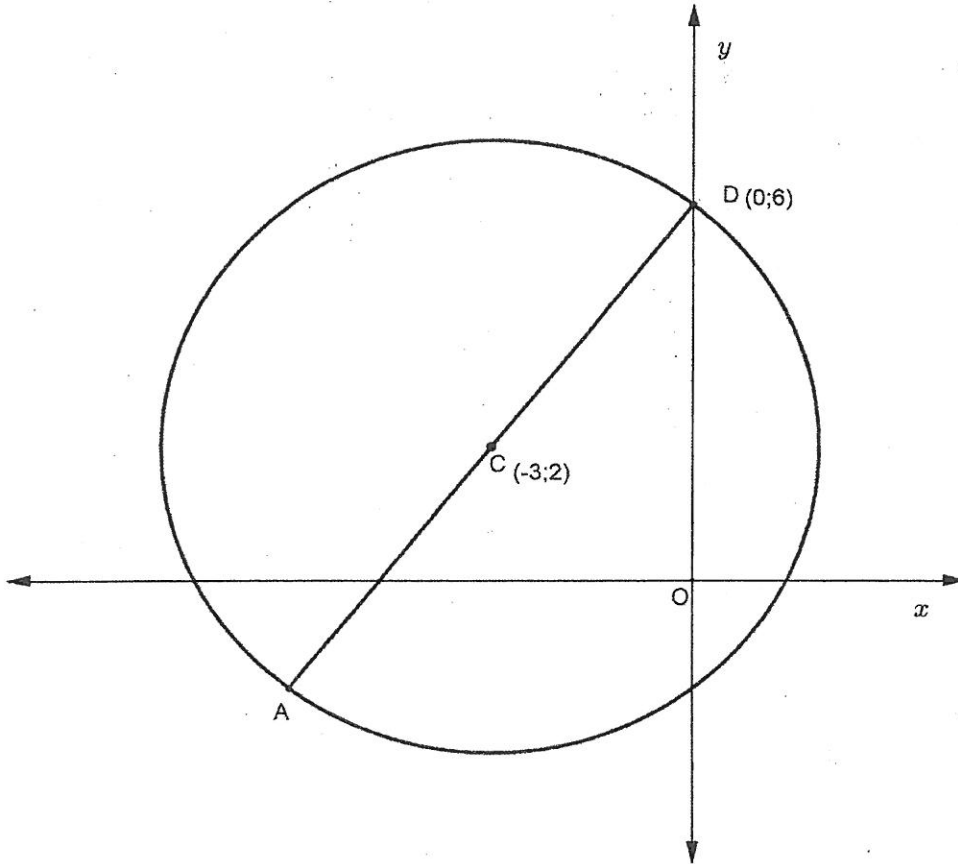
3. In the diagram below, ABC is a triangle with coordinates $A(-3;-4)$, $B(4;0)$ and $C(1\frac{1}{2}; 5)$, M is the midpoint of AB and D is a point of intersection of AC and the y – axis.



- 3.1 Determine the following
- 3.1.1 the gradient of line AC. (2)
- 3.1.2 length of BC to 2 d. p. (2)
- 3.1.3 the coordinates of M the midpoint of line AB. (2)
- 3.1.4 the coordinates of D. (3)
- 3.2 Show that $BD \perp AC$. (3)

QUESTION 4 [9]

- 4 In the diagram below $C(-3;2)$ is the centre of a circle and $D(0;6)$ is given.



- 4.1 Give a reason why $CD = CA$. (1)
- 4.2 Calculate the coordinates of A. (2)
- 4.3 Determine the gradient of CD. (2)
- 4.4 Determine the equation of the line (not shown) parallel to CD and passing through the point $(-6;5)$. (3)
- 4.5 Now, write your answer to 4.4 in the form $ax + by + c = 0$.
where a, b, c are integers. (1)

QUESTION 5 [11]

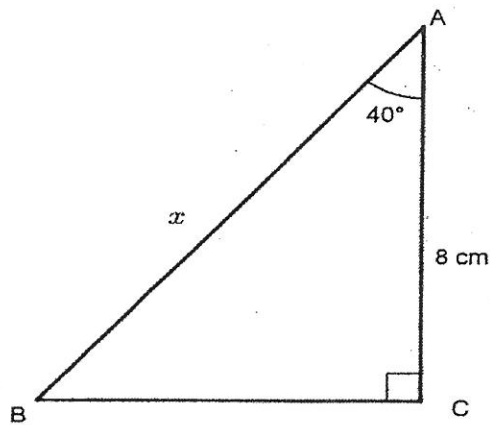
5.1 Solve for θ where $\theta \in (0^\circ, 90^\circ)$

5.1.1 $\frac{\sin \theta}{2} = \frac{\sin 50^\circ}{6}$ (2)

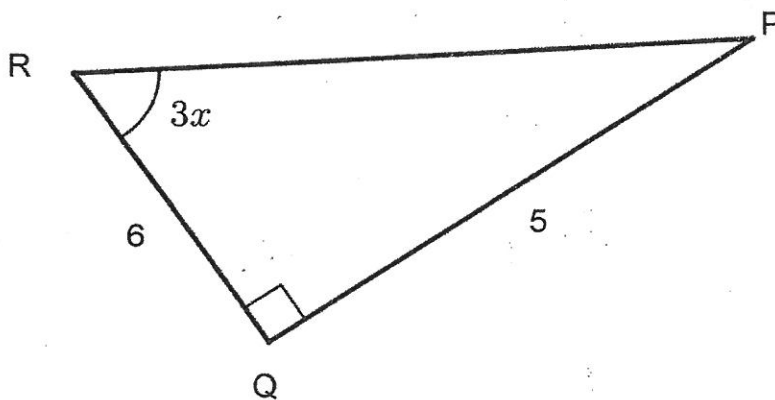
5.1.2 $8^2 = 10^2 + 9^2 - 2 \times 10 \times 9 \times \cos \theta$. (2)

5.2 Calculate the value of x

5.2.1. (2)



5.2.2 (3)



5.3 Evaluate, if $\theta = 15^\circ$, $\frac{3 \tan^2 \theta}{\cos 2\theta - 1}$ (2)

QUESTION 6 [12]

6. CALCULATORS MAY NOT BE USED IN THIS QUESTION.

6.1 Evaluate the following

6.1.1 $\tan 30^\circ$ (2)

6.1.2 $\sin 45^\circ$ (2)

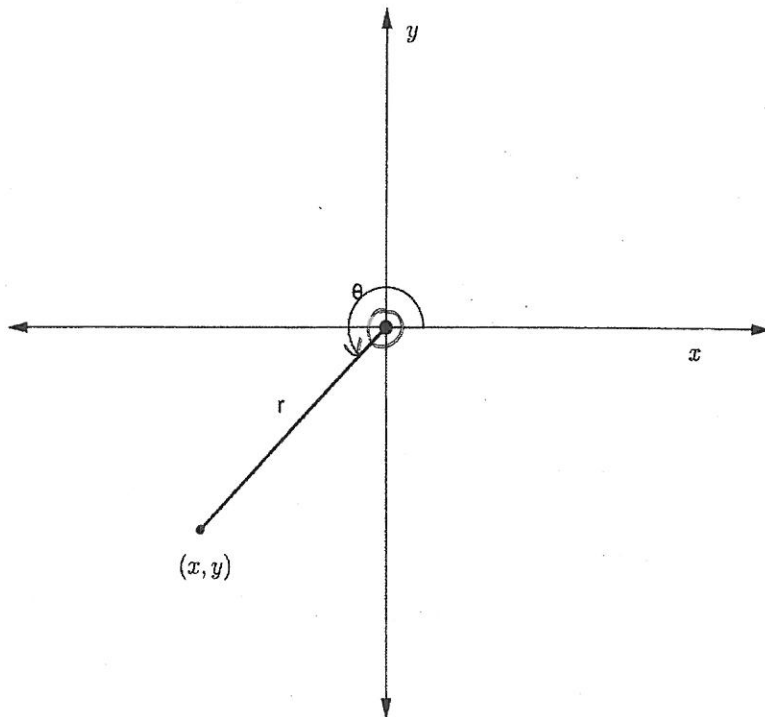
6.2 Given

- $\sin \theta = \frac{-5}{13}$

- $\tan \theta > 0$

6.2.1 Explain why θ must be an angle in Quadrant 3. (2)

6.2.2 Use the initial given information to calculate x , y and r in the associated diagram below. (3)



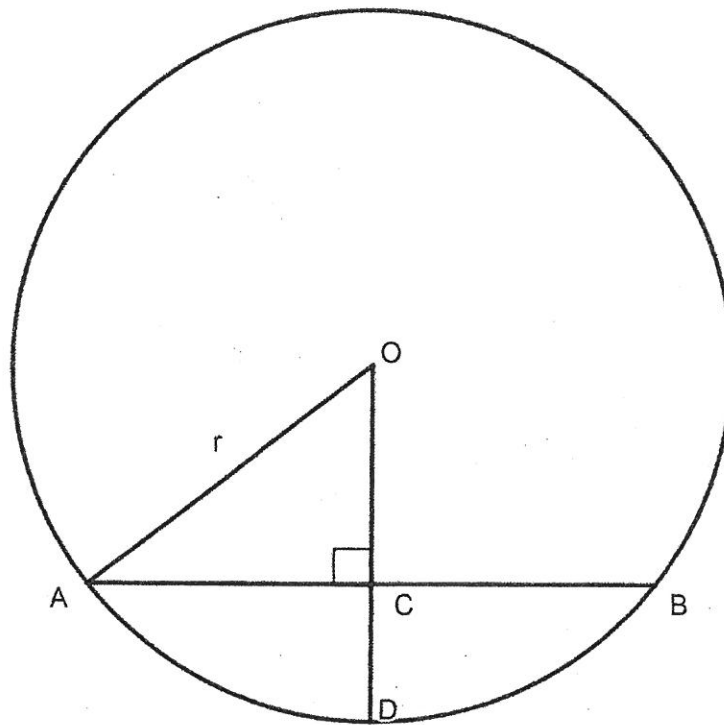
6.2.3 Hence, determine $\sin^2 \theta + \cos^2 \theta$. (3)

QUESTION 7 [7]

7 Complete the following theorem.

7.1 The line drawn from centre of the circle 7.1.1.....
to chord will 7.1.2the chord. (2)

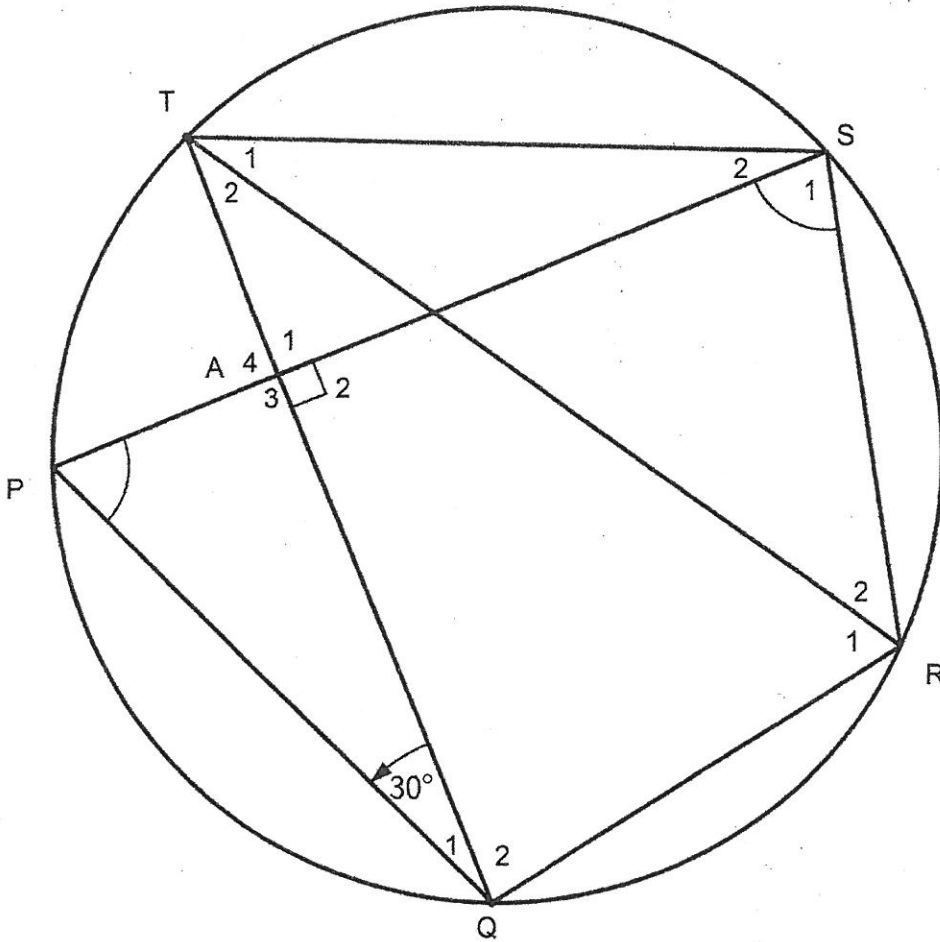
7.2 In the diagram, O is the centre of the circle. Chord AB = 24cm.
OC \perp AB. If CD = 8cm, calculate the length of the
radius of the circle. Let OA = r . (5)



QUESTION 8 [10]

8. In the diagram below, TR is a chord of the circle PQRST.

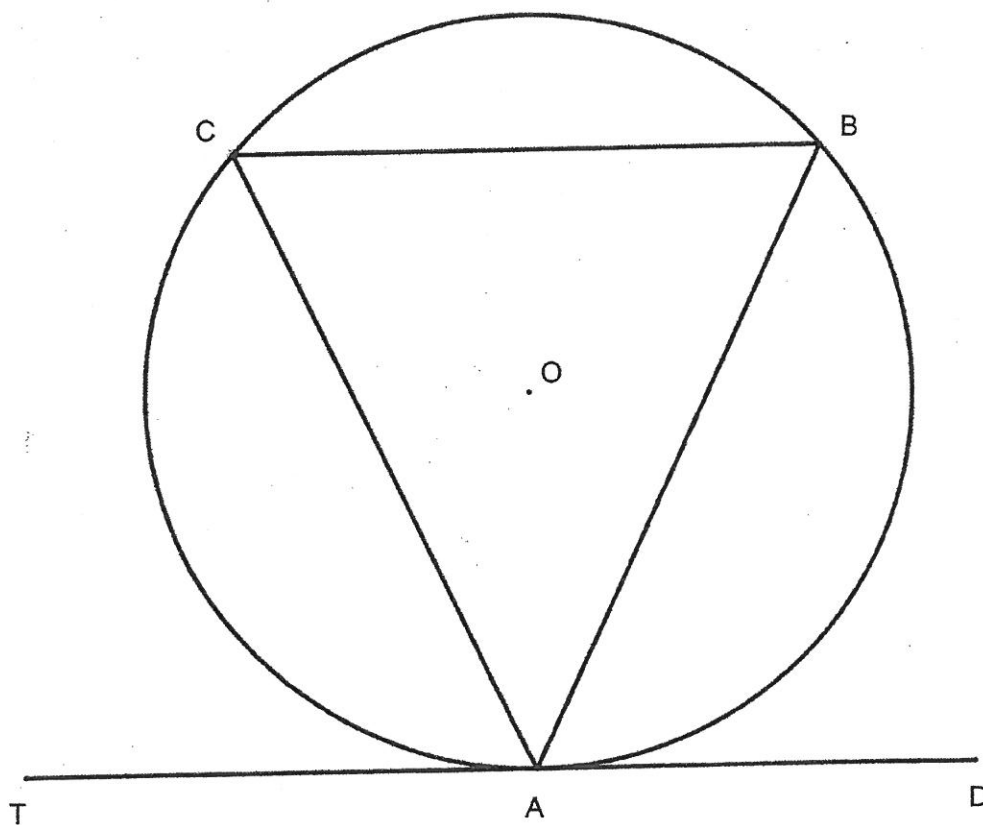
$QAT \perp PAS$, $\widehat{Q_1} = 30^\circ$, $\widehat{P} = \widehat{S_1}$



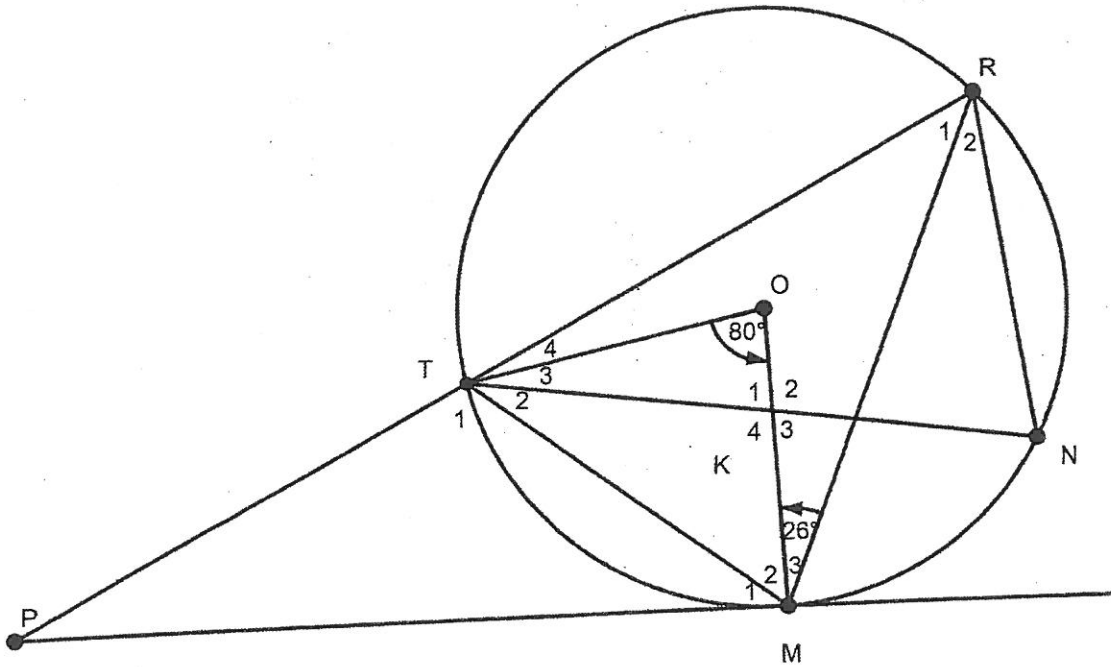
- 8.1 Name stating reasons, three angles equal to 60° . (4)
- 8.2 Calculate the size of angle \widehat{QRS} . (2)
- 8.3 Prove that $PS \parallel QR$. (2)
- 8.4 Prove that TR is a diameter of the circle. (2)

QUESTION 9 [18]

- 9.1 TAD is a tangent to the circle centre O. Prove the theorem which states that $\widehat{BAD} = \widehat{ACB}$. (7)



- 9.2 In the diagram below, O is the centre of the circle TRNM. RT produced meets tangent MP at P. OM intersects TN at K. K is the midpoint of TN
- $\widehat{MOT} = 80^\circ$, $\widehat{M}_3 = 26^\circ$.

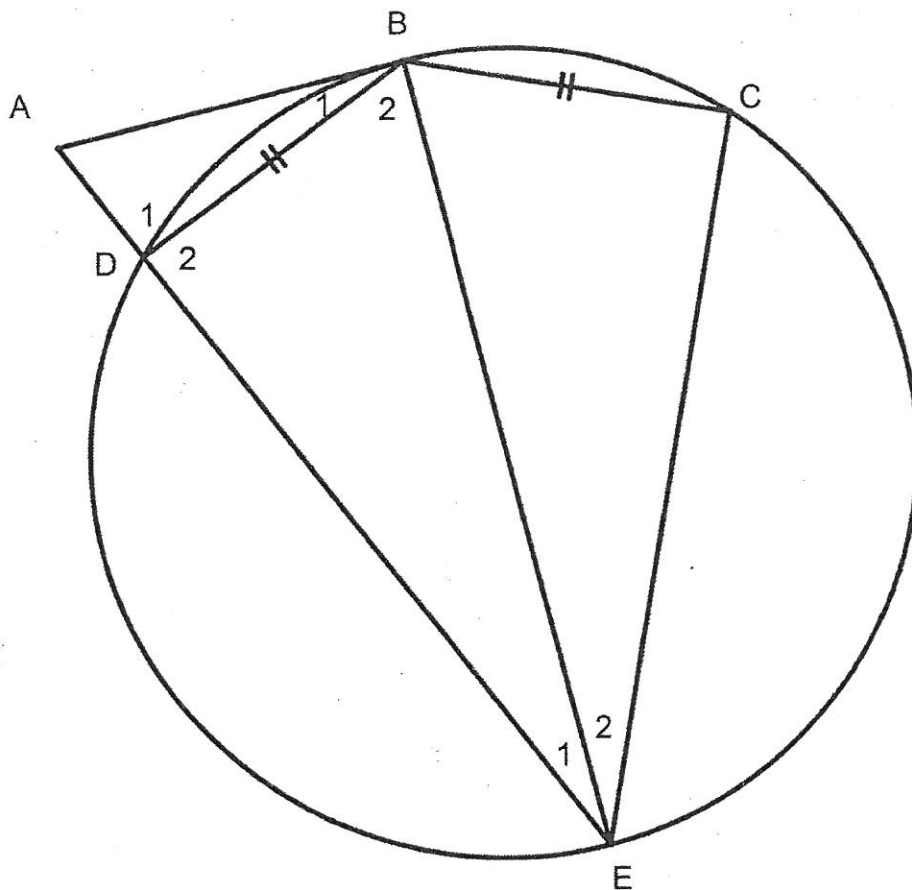


Calculate with reasons

- 9.2.1 \widehat{M}_1 (4)
- 9.2.2 \widehat{N} (4)
- 9.2.2 \widehat{T}_3 (3)

QUESTION 10 [4]

10. AB is a tangent to the circle. DB = BC.



10.1 Prove that $\widehat{B}_1 = \widehat{E}_2$. (2)

10.2 Complete $\widehat{D}_1 = \dots\dots\dots$ (2)

[TOTAL 100 MARKS]