

AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS X EXAMINATION

MAY 2015

Mathematics Paper II

Time: 2 hours 20 minutes Marks: 45

INSTRUCTIONS

Please read the following instructions carefully.

1. Check your name and school information. Sign if it is accurate.

**I agree that this is my name and school.
Candidate's signature**

2. RUBRIC. There are ELEVEN questions. Answer ALL questions. Choices are specified inside the paper.
3. When answering the questions:

Read each question carefully.
Use a black pencil for diagrams. DO NOT use coloured pencils.
DO NOT use staples, paper clips, glue, correcting fluid or ink erasers.
Complete your answer in the allocated space only. DO NOT write outside the answer box.
4. The marks for the questions are shown in brackets ().
5. You may use a simple calculator if you wish.

(ATTEMPT EITHER PART a OR PART b OF Q.1.)

Q.1.

(Total 5 Marks)

- If $4 - 12x + 13x^2 + ax^3 + x^4$ is a perfect square, find the value of a .
- The highest common factor and the least common multiple of TWO quadratic expressions are $(5x + 4)$ and $(6x^2 - 7x - 20)(5x + 4)$ respectively. Find these two quadratic expressions.

[illegible]

Q.2.

(Total 3 Marks)

If $\frac{5x-3}{(x-1)(x-2)} = -\frac{2}{x-1} + \frac{Q}{x-2}$, find the value of Q .

(ATTEMPT EITHER PART a OR PART b OF Q.3.)

Q.3.

(Total 5 Marks)

a.

- i. Find the value of x for $-6 < \frac{3-3x}{2} \leq 12, x \in R$. (3 Marks)

- ii. Represent the solution of $-6 < \frac{3-3x}{2} \leq 12, x \in R$ on a number line. (2 Marks)

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(ATTEMPT EITHER PART a OR PART b OF Q.3.)

b. Solve $|4x - 1| = |3x - 2|$. Also verify your answer.

(5 Marks)

[illegible]

Q.4.

(Total 4 Marks)

A family of 3 adults and 2 children enjoyed a movie at the cinema for Rs 3,100. This can be represented by the equation $3x + 2y = 3100$, where x and y represent the cost of each adult and child ticket respectively. Next week, their uncle and his 2 children join them for another movie and the total cost this time is Rs 4,800. Assuming the cost of tickets remain the same, what is the cost of a child's ticket?

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Q.5.

(Total 4 Marks)

Use **quadratic formula** to find the values of x for $16x^2 + 28x = 4$.

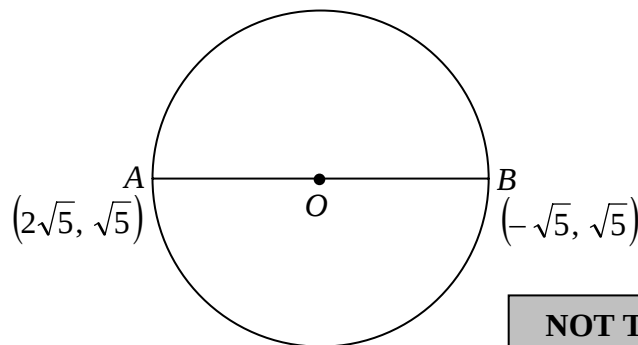
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(ATTEMPT EITHER PART a OR PART b OF Q.6.)

Q.6.

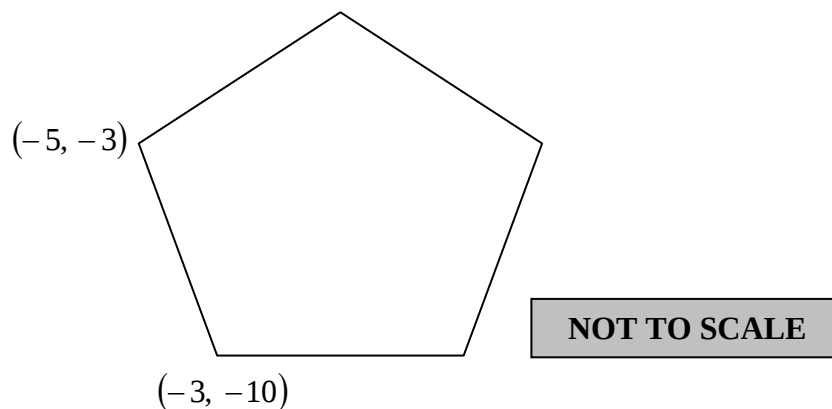
(Total 3 Marks)

- a. A circle having centre O is shown below. Find the coordinates of point O .



- b. The diagram shows a small garden which is in the shape of a **regular pentagon** (a polygon having five equal sides). If a child walks on all the edges of this park once, what is the distance that he covers?

[Note: The distance found will be in metres]



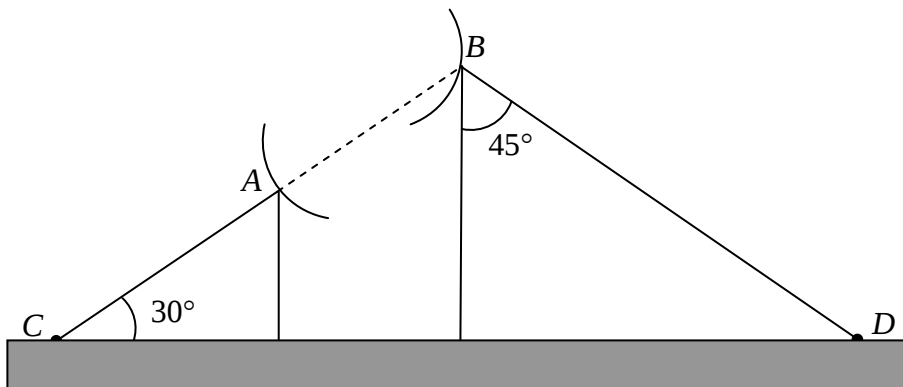
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(ATTEMPT EITHER PART a OR PART b OF Q.7.)

Q.7. (Total 4 Marks)

a. Show that $\frac{\cot^2 x + (1 + \operatorname{cosec} x)^2}{(1 + \operatorname{cosec} x)} = \frac{2}{\sin x}$

- b. A signal link has to be set up between two microwave dishes A and B as shown below. The towers holding the dishes are to be set vertical with the help of ropes on either side from points C and D on ground. If the height of A and B is 1.5 m and 4 m respectively, find the total length of the rope required to set up both towers.

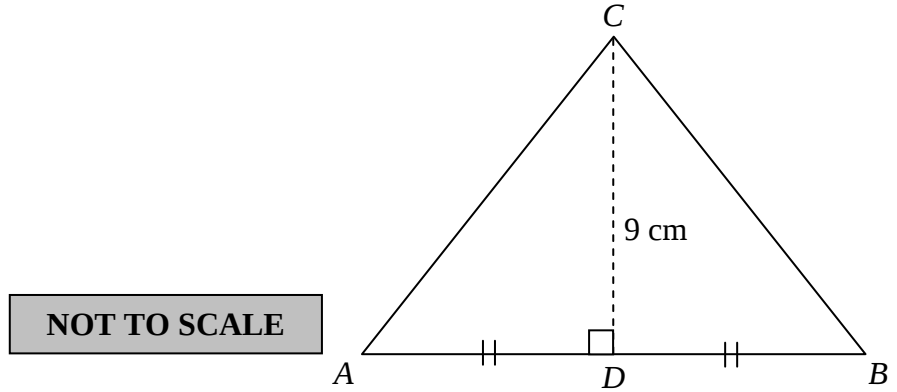
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(ATTEMPT EITHER PART a OR PART b OF Q.8.)

Q.8.

(Total 4 Marks)

- a. Find the length of the sides of the given equilateral triangle that has a height of 9 cm.



- b. Find the area of a square that has a diagonal of 10 cm.

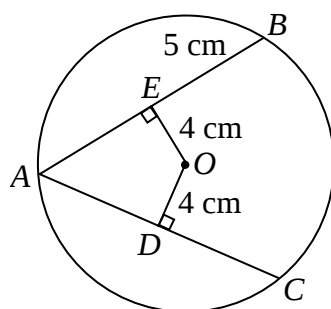
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Q.9.

(Total 4 Marks)

In the given circle with centre O , $\overline{BE} = 5$ cm and $\overline{OE} = \overline{OD} = 4$ cm.

- Find the length of $\overline{DC}$ and write a statement to justify your answer. (2 Marks)
- Find the length of $\overline{AB}$ and write a statement to justify your answer. (2 Marks)



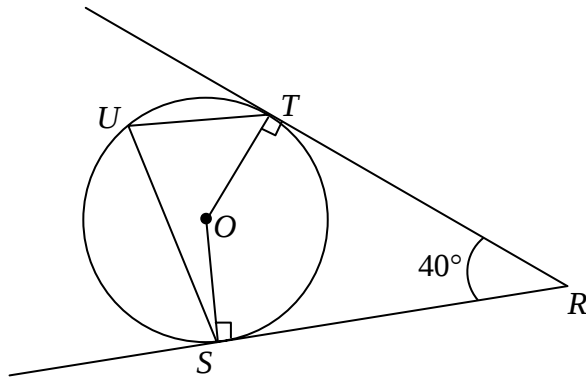
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Q.10.

(Total 4 Marks)

$\overline{RS}$ and $\overline{RT}$ are tangents to a circle with centre O . If $m\angle SRT = 40^\circ$, find $m\angle SUT$.



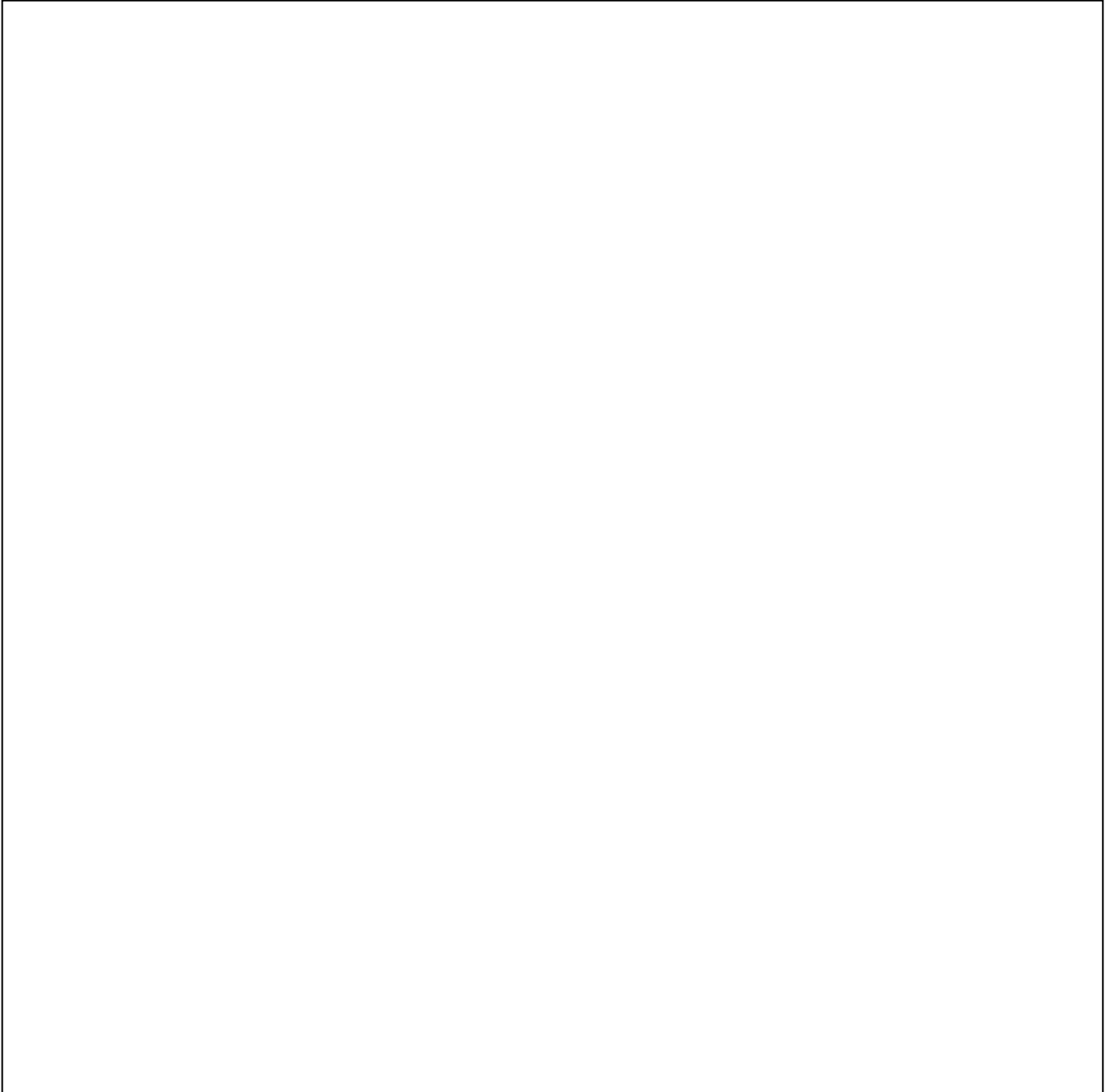
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Q.11.

(Total 5 Marks)

Draw a circle of radius 3 cm, having centre O . Draw tangents to this circle from a point P , which lies 7 cm away from the centre of this circle. Write down the length of the tangents from point P to the point of tangency to the circle.



END OF PAPER