AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS X

ANNUAL EXAMINATIONS (THEORY) 2025

Mathematics Paper II

Time: 1 hour 40 minutes Marks: 30

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**

RUBRIC

2. There are NINE questions. Answer ALL questions. Choices are specified inside the paper.

3. When answering the questions:

   Read each question carefully.
   Use a black pointer to write your answers. DO NOT write your answers in pencil.
   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. A formulae list is provided on page 2. You may refer to it during the paper, if you wish.

6. You may use a simple calculator if you wish.

List of Formulae

Note:

- All symbols used in the formulae have their usual meaning.

Basic Statistics

$$\overline{X} = \frac{\sum x}{n}$$

$$\overline{X} = \frac{\sum fx}{n} \text{ or } \overline{X} = \frac{\sum fx}{\sum f}$$

$$\sigma^2 = \frac{\sum x^2}{n} - \left(\frac{\sum x}{n}\right)^2$$

$$\text{Median} = l + \frac{1}{f}\left(\frac{n}{2} - c\right) \times h$$

$$\text{Mode} = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$$

$$\sigma = \sqrt{\frac{\sum x^2}{n} - \left(\frac{\sum x}{n}\right)^2}$$

Algebraic Manipulation

$$HCF \times LCM = p(x) \times q(x)$$

Linear Graphs and their Applications

$$1 \text{ mile} = \frac{8}{5} \text{km}$$

1 Hectare = 2.471 Acres

$$°F = \frac{9}{5} \times °\text{C} + 32$$

Quadratic Equations

$$ax^2 + bx + c = 0,\ a \neq 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\text{Disc} = b^2 - 4ac$$

Introduction to Coordinate Geometry

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$\text{MP} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

Introduction to Trigonometry

$$1° = \frac{\pi}{180} \text{ rad},\ 1\ rad = \left(\frac{180}{\pi}\right)°$$

$$A = \frac{1}{2} r^2 \theta$$

$$\sin^2\theta + \cos^2\theta = 1$$

$$l = r\theta$$

$$1 + \tan^2\theta = \sec^2\theta$$

$$1 + \cot^2\theta = \text{cosec}^2\theta$$

Algebraic Formulae

$$(a-b)^2 = a^2 - 2ab + b^2$$

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$a^2 - b^2 = (a+b)(a-b)$$

$$(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$$

$$(a+b)^2 - (a-b)^2 = 4ab$$

$$a^3 - b^3 = (a-b)\left(a^2 + ab + b^2\right)$$

$$(a+b)^2 + (a-b)^2 = 2\left(a^2 + b^2\right)$$

$$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

$$a^3 + b^3 = (a+b)\left(a^2 - ab + b^2\right)$$

$$(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$$

Q.1. (Total 3 Marks)

The given table shows 18 people's favourite colour.

i. Complete the given table. (1 Mark)

Colour	Number of People (*f*)	Angles
Red	3	
Blue	4	
Green	6	
Yellow	5	
Total	18	

ii. Display the information (completed in part i) as a pie chart. (2 Marks)

Space for a pie chart

(ATTEMPT EITHER PART a OR PART b OF Q.2.)

Q.2. (Total 4 Marks)

a. Find the square root of the given expression.

$$4\frac{x^2}{y^2}+20\frac{x}{y}+13-30\frac{y}{x}+9\frac{y^2}{x^2}$$

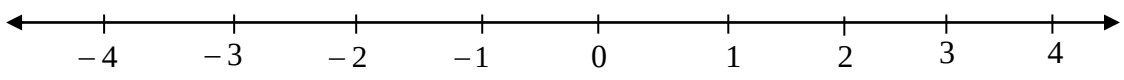
b. Resolve the fraction $\frac{2}{(x^2-9)}$ into partial fractions and find the value of *A* and *B*.

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

Q.3. (Total 3 Marks)

a. The sum of the ages of a father and his son is 45. If the father is 15 years older than the son, determine their ages using linear equations.

b. Solve the inequality $2(2x+5) \geq 18$ and show the solution on the given number line.



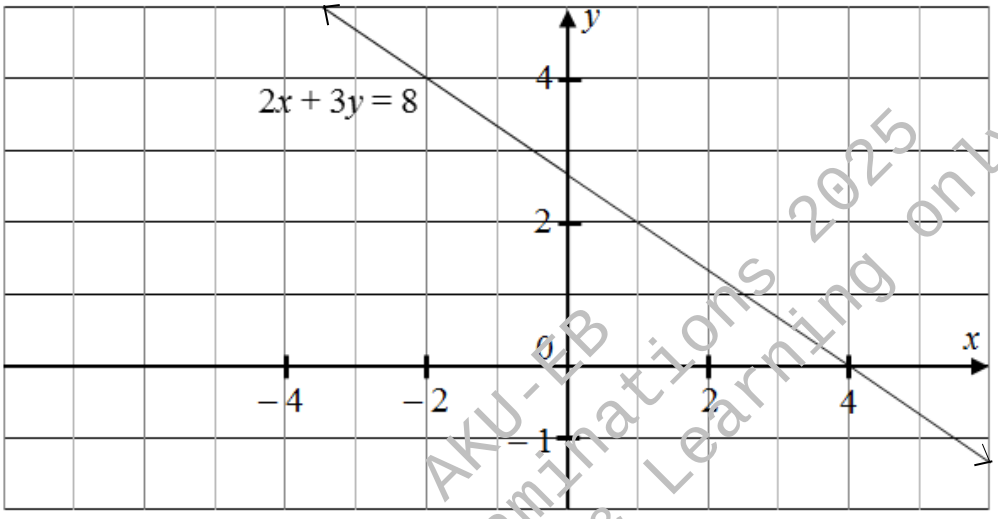
Q.4. (Total 3 Marks)

The simultaneous linear equations are: $x+y=3$ and $2x+3y=8$.

i. Line $2x+3y=8$ is shown in the given graph.

On the same graph, draw another line $x+y=3$ by taking any two points. (2 Marks)

ii. From the graph, find and write the solution set. (1 Mark)



Q.5. (Total 3 Marks)

Find the roots of the equation $2x^2 + 5x + 2 = 0$ by using quadratic formula.

Q.6. (Total 3 Marks)

Three points have coordinates $A(-b,-b)$, $B(b,b)$ and $C(-\sqrt{3}b,\sqrt{3}b)$.

Show that *ABC* is an equilateral triangle.

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

Q.7. (Total 4 Marks)

a. Prove that $\frac{(1+\sin\theta)(1-\sin\theta)}{\cos^4\theta} = 1+\tan^2\theta$.

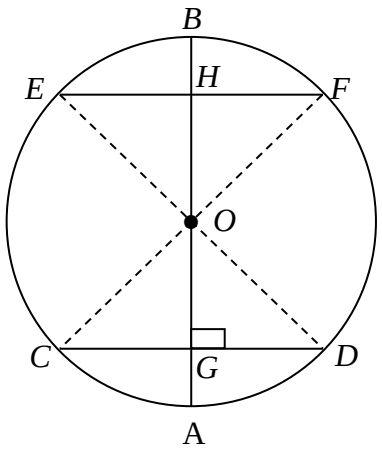
b. Show, by working, that the given lengths $2ab$, a^2-b^2 and a^2+b^2 are the sides of a right angled triangle.

(**Note:** *a* and *b* are positive integers.)

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

Q.8. (Total 4 Marks)

a. Consider the given circle with centre *O*.



NOT TO SCALE

$\overline{AB} = 10\,\text{cm}$ is the diametre of the circle and $\overline{OH} \cong \overline{OG}$.

i. Is $\overline{CD} \cong \overline{EF}$? (1 Mark)

ii. Find $\overline{OE}$ and justify your answer. (2 Marks)

iii. Write the relation between $\overline{CG}$ and $\overline{CD}$. (1 Mark)

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

b. Complete the following sentences.

i. The measure of a central angle of a minor arc of a circle is double that of the angle subtended by the corresponding _____.

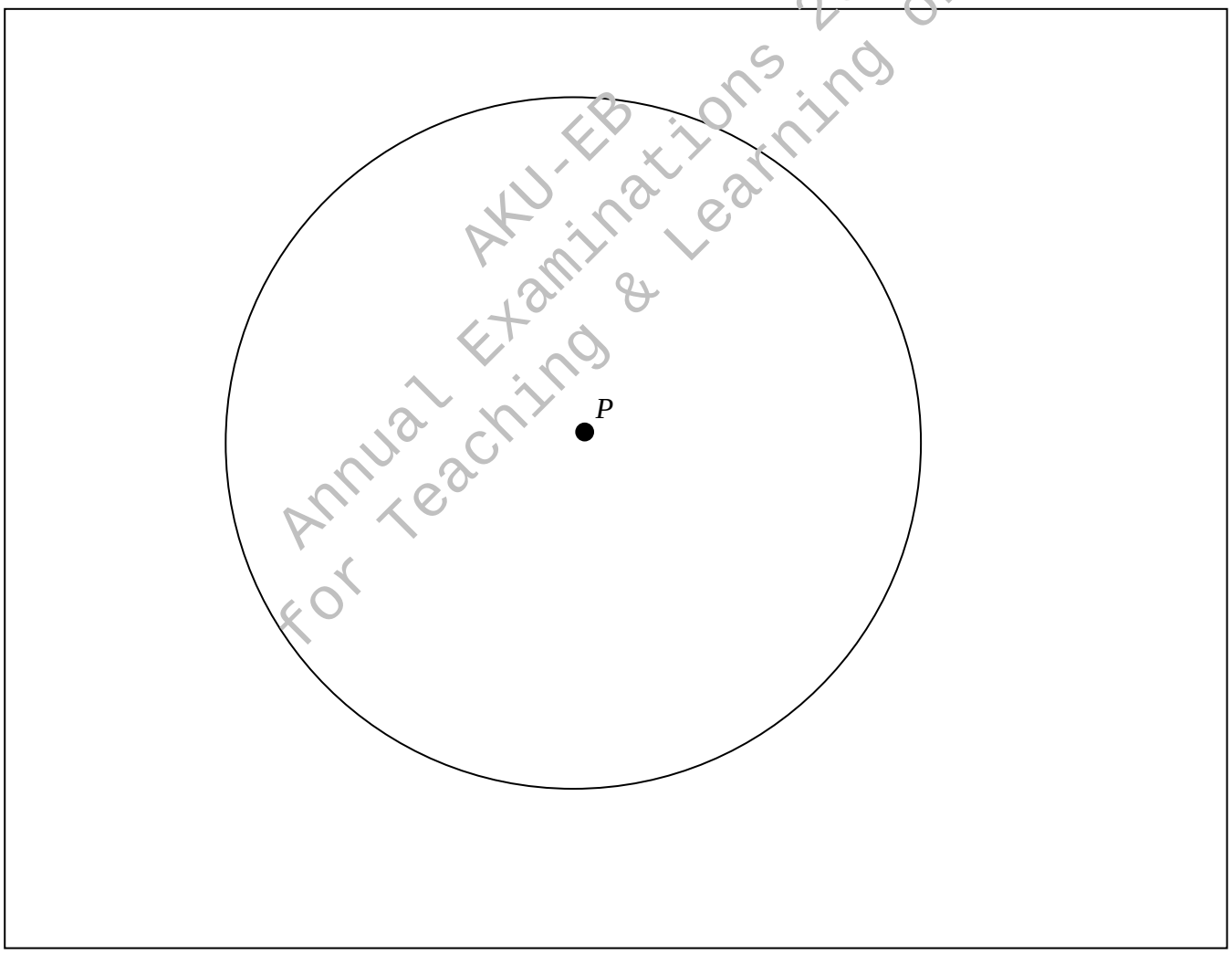
ii. The inscribed angle in a semi-circle is a _____.

iii. The angle in a segment is less than a semi-circle and greater than the _____.

iv. The opposite angles of any quadrilateral inscribed in a circle are _____.

Q.9. (Total 3 Marks)

Draw an inscribed regular hexagon in the given circle.



END OF PAPER

Please use this page for rough work

Please use this page for rough work