

AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX EXAMINATION

MAY 2014

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 4 Marks)

a. Prove that $\frac{2-2\sqrt{-1}}{2i} = -1-i$

b. Simplify $\sqrt{\frac{32a^2b^3c^6}{2b^{-3}c^2}}$

[illegible]

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

Q.2.

(Total 4 Marks)

- a. If $A = \{1, 2, 3, 4\}$, $B = \{2, 6, 4\}$ and $C = \{4, 6, 8\}$, then prove that $A \cup (B \cup C) = (A \cup B) \cup C$

(4 Marks)

- b. For $A = \{0, 1, 3\}$ and $B = \{-1, 0\}$ do as directed.

- i. Find $A \times B$

(1 Mark)

- ii. Find a function from A to B

(1 Mark)

- iii. Find domain of the function

(1 Mark)

- iv. Find range of the function

(1 Mark)

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Q.3.

(Total 3 Marks)

If $\log_x 729 = 3$, then find the value of x .

(ATTEMPT EITHER PART a OR PART b OF Q.4.)

Q.4.

(Total 4 Marks)

a.

- i. Evaluate $\frac{x^2y - 2z^3}{2x^2z}$ for $x = -1, y = 1$ and $z = 2$ (2 Marks)

- ii. Simplify $(x^2 - 4) \times \frac{x+2}{x-2}$ (2 Marks)

- b. Simplify $(\sqrt{a} + \frac{1}{\sqrt{b}})(\sqrt{a} - \frac{1}{\sqrt{b}})(a + \frac{1}{b})(a^2 + \frac{1}{b^2})$ (4 Marks)

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(ATTEMPT EITHER PART a OR PART b OF Q.5.)

Q.5.

(Total 5 Marks)

a.

i. Factorize $a^2 + 81b^2 + 18ab$

(2 Marks)

ii. Factorize $c^2 + 17c + 30$

(3 Marks)

b. Prove that $x - 2$ is a factor of $P(x) = x^3 - 3x - 2$. Also find the other two factors of the $P(x)$.

(5 Marks)

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

Q.6.

(Total 4 Marks)

- a. If $a : b = c : d$, then prove that $5a + 4b : b = 5c + 4d : d$
- b. If $\frac{a}{b} = \frac{c}{d}$, then prove that $\frac{3a + 2c}{3b + 2d} = \sqrt[3]{\frac{a^3}{b^3}}$ by using K method.

[illegible]

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Q.7.

(Total 5 Marks)

Find the inverse of the matrix $\begin{bmatrix} -3 & 5 \\ -1 & 2 \end{bmatrix}$. Verify that the product of the matrix and its inverse is equal to the unit matrix.

Q.8.

(Total 4 Marks)

The given table shows information about the height (in centimetres) of 150 plants.

Height (in cm)	Frequency	
20 – 29	7	
30 – 39	13	
40 – 49	70	
50 – 59	40	
60 – 69	20	

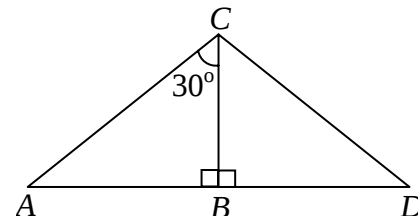
Complete the above table and draw a histogram.

Q.9.

(Total 4 Marks)

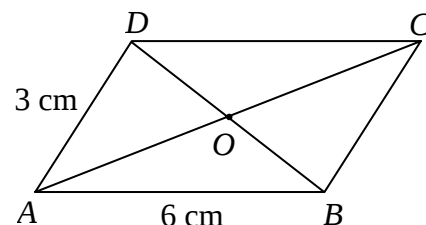
- i. If $\triangle ABC \cong \triangle DBC$, then find $m\angle D$. Also justify your answer.

(2 Marks)



- ii. In the given diagram if $ABCD$ is the parallelogram having $m\overline{AC} = b$ cm and $m\overline{BD} = a$ cm, then find $m\overline{BC}$ and $m\overline{OA}$. Also justify your answer.

(2 Marks)

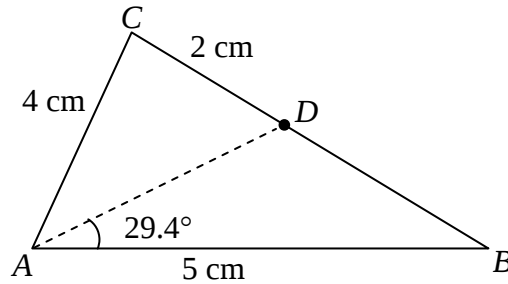


(ATTEMPT EITHER PART a OR PART b OF Q.10.)

Q.10.

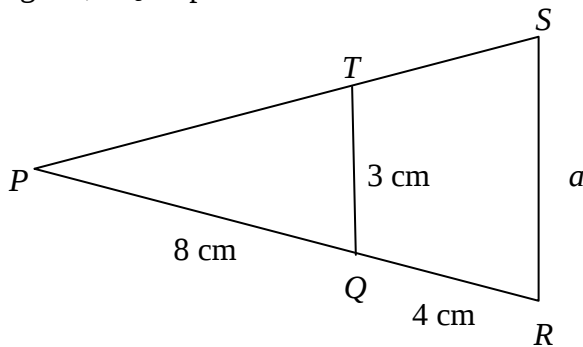
(Total 4 Marks)

- a. In the given $\triangle ABC$, if $\overline{AD}$ is the angle bisector of $\angle BAC$ and $m\overline{CD} = 2\text{cm}$, then find $m\overline{DB}$, $m\angle CAD$ and name the largest angle of the triangle $\triangle ABC$.



NOT TO SCALE

- b. In the given diagram, $\overline{TQ}$ is parallel to $\overline{SR}$.



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Find the value of a and also write ratio of $\overline{PT}$ to $\overline{TS}$.

Q.11.

(Total 4 Marks)

Construct a $\triangle ABC$ with $m\overline{AB} = 6\text{cm}$, $m\angle A = 60^\circ$ and $m\overline{BC} = 7\text{cm}$. Also draw the angle bisector of $\angle C$.



END OF PAPER

Please use this page for rough work