AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX EXAMINATION

MAY 2012

Mathematics Paper II

Time allowed: 2 hours 20 minutes Marks 45

INSTRUCTIONS

Please read the following instructions carefully.

1. Check your name and school information. Sign that it is correct.

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

2. RUBRIC. There are ELEVEN questions. Answer ALL ELEVEN 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.

i. Write multiplicative and additive inverse of $-\frac{1}{\sqrt{2}}$. (2 Marks)

ii. If $z = a + ib$, then find $\bar{z}$ and $z + \bar{z}$, where $\bar{z}$ is the conjugate of z. (2 Marks)

b. Simplify $\frac{\sqrt[4]{16x^8y^4}}{\sqrt{16x^4y^2}}$. (4 Marks)

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

Q.2. (Total 4 Marks)

a. If $A = \{1,2,3,4,5\}$ and $B = \{3,4,5,6,7\}$, then find $A \Delta B$.
Where $A \Delta B = (A \cup B) - (A \cap B)$. Also represent $A \Delta B$ through a Venn diagram. (4 Marks)

b. If $A = \{2,4,5\}$ and $B = \{x, y\}$, then

i. find $A \times B$. (2 Marks)

ii. write one binary relation from A to B containing three elements. Also write its range. (2 Marks)

Q.3. (Total 3 Marks)

Find the value of a if $\log_a 343 = 3$.

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

Q.4. (Total 4 Marks)

a.

i. Find the value of $\frac{xy^2 - x^2y}{x^2 + y^2}$ when $x = 2$ and $y = -1$. (2 Marks)

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

b.

i. Write the conjugate of $\sqrt{2} - \sqrt{3}$. (1 Mark)

ii. If $a - b = 1$ and $a^3 - b^3 = 19$, then find the value of $3ab$. (3 Marks)

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

Q.5. (Total 5 Marks)

a. Factorize $\left(x^4 + 4\right)$ completely. (5 Marks)

b.

i. Factorize $\left(24t^3 - 3\right)$ completely. (3 Marks)

ii. Factorize $\left(9x^2 - 16\right)$ completely. (2 Marks)

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

Q.6. (Total 4 Marks)

a. If t is inversely proportional to the square root of r and it is known that $t = 9$ for $r = 16$, then find the value of t when $r = 36$.

b. If $a : b :: c : d$, then prove that $3a + 7b : 3c + 7d :: 3a - 7b : 3c - 7d$.

Q.7. (Total 5 Marks)

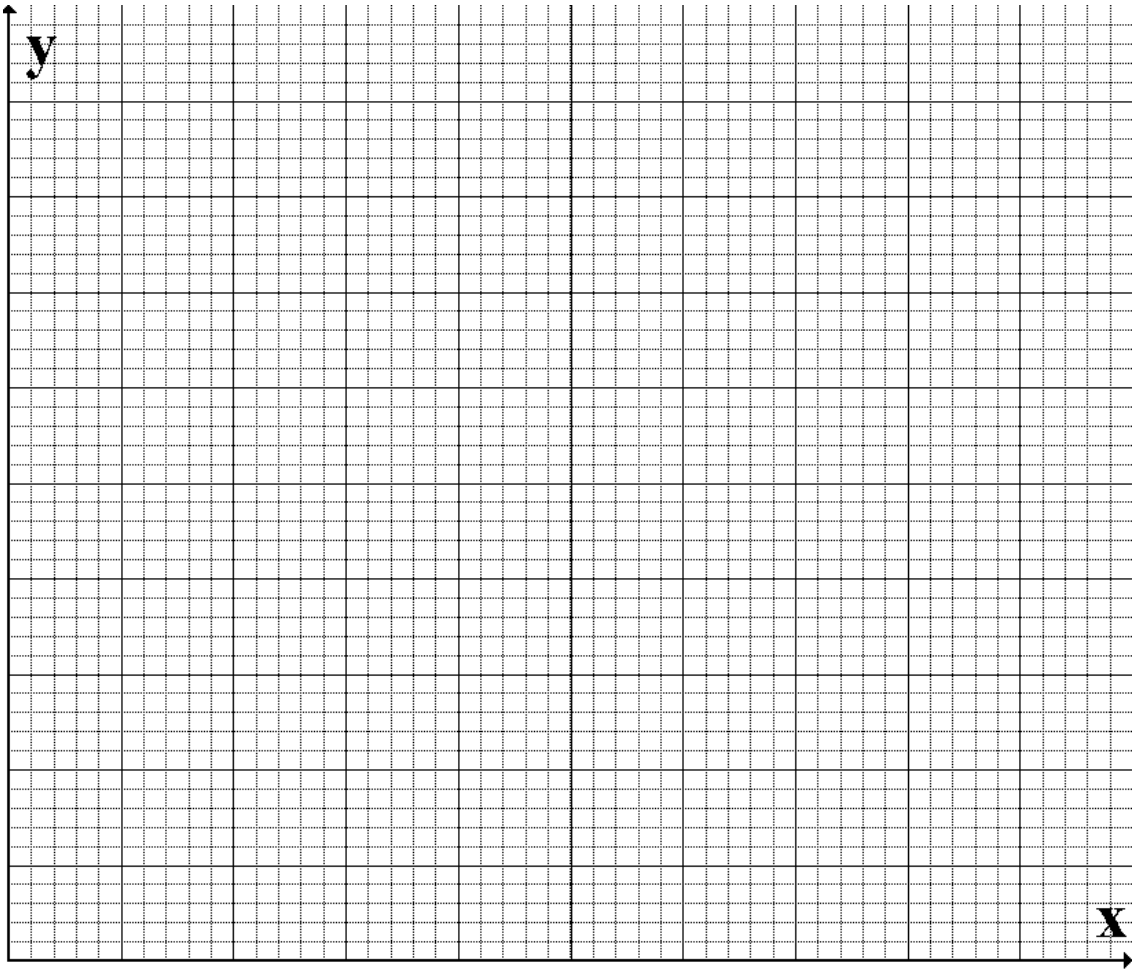
i. If $A^{-1} = \begin{bmatrix} 5 & 7 \\ 2 & 3 \end{bmatrix}$ and $|A| = 1$, then find matrix *A*. (3 Marks)

ii. If $\begin{bmatrix} 2 & 3 \\ 9 & 8 \end{bmatrix} + B = \begin{bmatrix} 3 & 3 \\ 9 & 9 \end{bmatrix}$, then find *B*. (2 Marks)

Q.8. (Total 4 Marks)

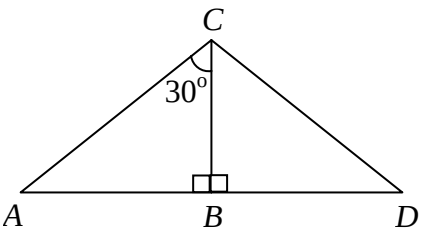
Complete the following table and draw a cumulative frequency polygon for the height of 80 plants.

Height (cm)	**Number of plants**		
5 – 10	5		
11 – 16	15		
17 – 22	25		
23 – 28	20		
29 – 34	15		

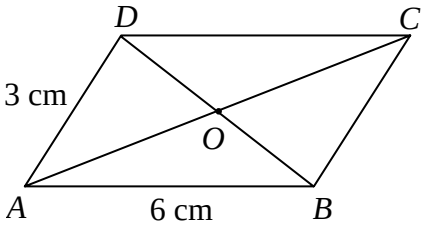


Q.9. (Total 4 Marks)

i. If $\Delta ABC \cong \Delta BCD$, then find $m \angle D$. Also justify your answer. (2 Marks)



ii. In the given diagram $ABCD$ is the parallelogram. If $m\ \overline{AC} = b$ cm and $m\ \overline{BD} = a$ cm, then find $m\ \overline{BC}$ and $m\ \overline{OA}$. Also justify your answer. (2 Marks)

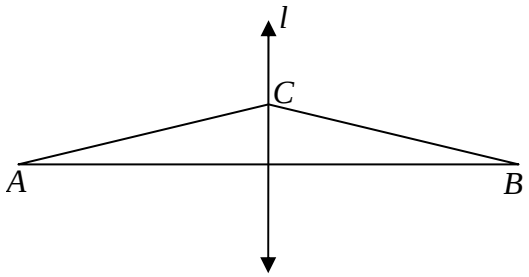


(ATTEMPT EITHER PART a OR PART b OF Q.10.)

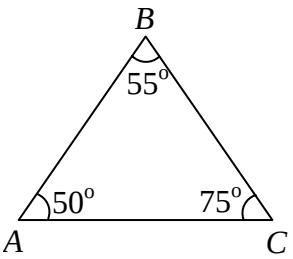
Q.10. (Total 4 Marks)

a.

i. If $m\,\overline{AB} = 8$ cm , $m\,\overline{AC} = 5$ cm and l is the right bisector of $\overline{AB}$, then find $m\,\overline{BC}$. Also justify your answer. (2 Marks)



ii. Identify the smallest side of the triangle *ABC*. Also justify your answer. (2 Marks)



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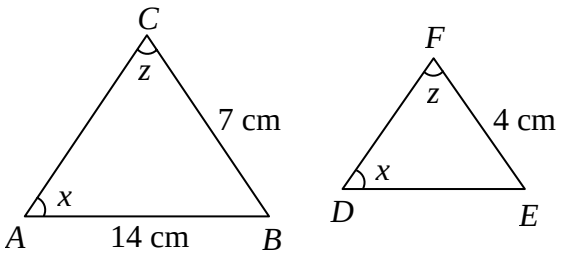
(ATTEMPT EITHER PART a OR PART b OF Q.10.)

b.

i. Are $4\sqrt{3}$, $4\sqrt{3}$ and $8\sqrt{3}$ sides of a triangle ? Also justify your answer. (2 Marks)

ii. If ΔABC is similar to ΔDEF , then find $m\ \overline{DE}$. (2 Marks)



Q.11. (Total 4 Marks)

Construct a triangle ABC with $m\ \overline{AB} = 6$ cm , $m \angle A = 50°$ and $m \angle B = 60°$.
Also draw perpendicular bisectors of any two sides of the triangle.

END OF PAPER

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