AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS IX EXAMINATION

APRIL/ MAY 2019

Mathematics Paper II

Time: 2 hours 10 minutes   Marks: 40

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.   You may use a simple calculator if you wish.

Q.1. (Total 4 Marks)

For two non-empty sets *A* and *B*, an **onto function** from *A* to *B* is defined as
$f_1 = \{(p, 10), (q, 10), (r, 25), (s, 30)\}$.

Using the given information, answer the following parts:

i.   Find the domain of f_1. (1 Mark)

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ii. Find the set *A*. (1 Mark)

_____

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iii. Select and write down the possible set *B* from the given two choices. (1 Mark)

Choice I: {10, 25, 30}
Choice II: {10, 15, 20, 25, 30}

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iv. Write down a function f_2 from *A* to *B*. (1 Mark)

(**Note:** f_2 should not be the same as f_1)

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Q.2. (Total 4 Marks)

Simplify $\sqrt[3]{\dfrac{64x^{12}y^2}{x^3y^{-4}}}$.

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Q.3. (Total 4 Marks)

For the given logarithmic equation $x = \log_3 27 + \log_3 3 - \log_3 3^2$, find the value of x.

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

Q.4. (Total 5 Marks)

a. For $2x - a = -\dfrac{1}{2x}$ prove that $8x^3 + \dfrac{1}{8x^3} = a^3 - 3a$.

b. Prove that $(2x + 3y)(2x - 3y)(4x^2 + 6xy + 9y^2)(4x^2 - 6xy + 9y^2) = 64x^6 - 729y^6$.

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

Q.5. (Total 5 Marks)

a. Factorise the expression $15x^3 - 24x^2 + 3x + 6x$.

b. Using factorisation, show that the expression $64a^4 + b^4$ can be written as $\left(8a^2 + b^2 + 4ab\right)\left(8a^2 + b^2 - 4ab\right)$.

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Q.6.   (Total 4 Marks)

If y is directly proportional to $\sqrt{x}$, then find the missing values of x and y in the following table.

x	16	3	?
y	4	?	9

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Q.7.   (Total 5 Marks)

a.   For the given matrix $A = \begin{bmatrix} 2 & 3 \\ 6 & 2 \end{bmatrix}$, find its

    i.   determinant.   (1 Mark)

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_____

    ii.   adjoint.   (1 Mark)

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    iii.   inverse.   (1 Mark)

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b.   Using result of part a, show that $A^{-1} \times A = I$.   (2 Marks)

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Q.8. (Total 3 Marks)

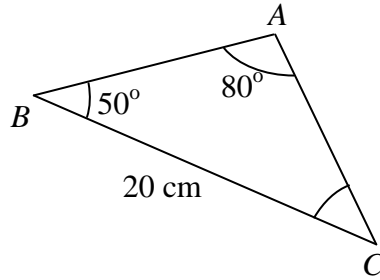For the given triangle *ABC*, show that the altitudes of the triangles are concurrent.

(ATTEMPT ANY TWO PARTS FROM a, b AND c OF Q.9.)

Q.9. (Total 6 Marks)

a. In the given figure, *ABC* is a triangle and sum of all its sides are 30.56 cm.

Find the length of the side *AB*. (3 Marks)

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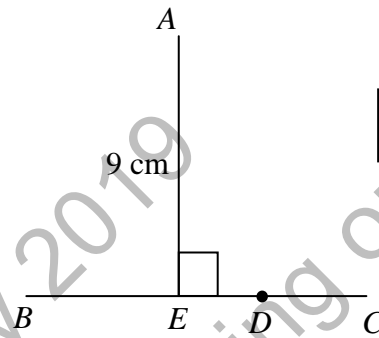
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b.

    i.   If lengths of any two sides of a triangle are 5 cm and 7 cm, then write any TWO possible lengths for the third side of the triangle. (1 Mark)

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    ii.   In the given diagram find any possible length of *AD*. Justify your answer (2 Marks)

A

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9 cm

B   *E*   *D*   *C*
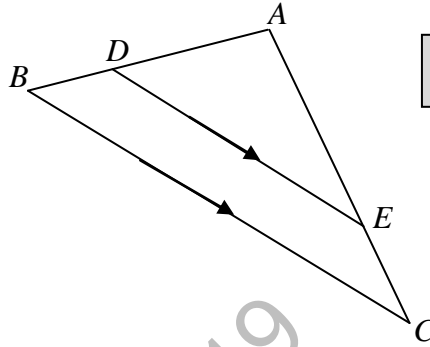
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(ATTEMPT ANY TWO PARTS FROM a, b AND c OF Q.9.)

c.   In the given figure *ABC* is a triangle and *DE* is parallel to *BC*.

Find the length of *DB* if *AB* = 6 cm, *AC* = 8 cm and *EC* = 2 cm.   (3 Marks)

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April/ May 2019
for
Teaching & Learning only