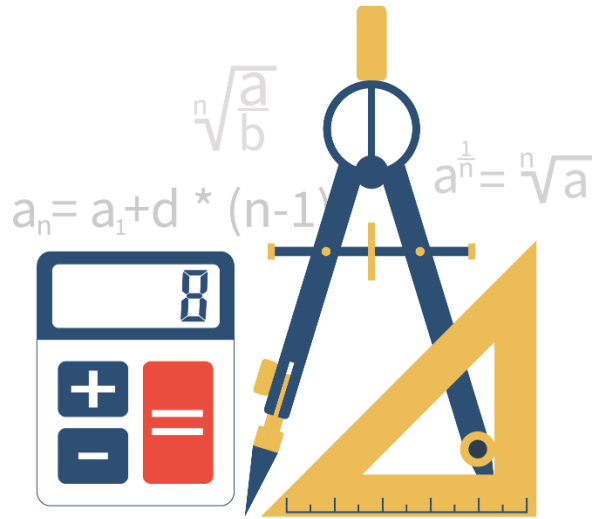


Guide to participation Mawhoob Competition Math Track

مؤسسة الملك عبدالعزيز ورجاله للموهبة والإبداع
King Abdulaziz & his Companions Foundation for Giftedness & Creativity



دليل المشاركة في مسابقة موهوب تخصص الرياضيات



mawhiba.org



Mawhiba

“ موهبة ... حيث تنتمي ”

Prepared by: Saudi mathematics team

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بِسْمِ الرَّحْمَنِ الرَّحِيمِ



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Introduction

In line with the Kingdom's determination to achieve vision 2030 objectives that are primarily concerned with transforming into an innovative knowledgeable society and the strategic plans directed to achieve the goals of sustainable national development and given that scientific competitions that are no longer an indispensable luxury, but rather have become an objective equation for excellence and progress in scientific fields. For the reason that it is with the momentum the competition to ascend the podiums, everyone who wants to achieve this must take all the means that allow them not only to access those platforms but to reserve a permanent place on them.

There is no doubt that many countries rely on local competitions as one of the methods for developing and raising the rates of scientific creativity and innovative capabilities and discovering the scientific talents of their students to provide them with the necessary scientific care. That fact has been perceived by the world around us for a long time.

Hungary, for instance, held the first mathematics competition in 1894, i.e. 119 years ago. Whereas more than 79 local competitions are organized at all levels and regions in the United States. Perhaps everyone agrees here that the mobility that these competitions do on all the elements of the educational process goes beyond solely winning a competition, but rather deepens on the positive impact, which aims at raising the professional competencies of teachers and achieving the ambition of our distinguished sons and daughters to obtain ideas that are much deeper than the ones provided by a school curriculum.

The methods of implementing these competitions vary according to the different goals and aspirations of the organizing countries. It is perhaps agreed upon by everyone here that the movement that these competitions make on all elements of the educational process goes beyond just winning a competition, but deepens the positive impact, which is aimed at raising the professional competencies of teachers and achieving the ambition of our distinguished sons and daughters. To get deeper ideas than what the school curriculum offers.

King Abdul Aziz and His Companions Foundation for Giftedness and Creativity "Mawhiba" have always been the forerunner to such challenges. From which it always aims to discover the nation's talents in scientific disciplines, and keen to find different sources to improve the quality of selection.

Along with the National Program for Gifted Students Identification, "Mawhoob" Mathematics Competition And science competition was established to delve deeply in search of these creative national competencies and capabilities to find them early. Allowing us to refine, nurture, and train them for a sufficient period to achieve the standards of participation in the International Olympiad programs.

What is a

It is a scientific competition in mathematics, science, physics, chemistry, biology, and informatics.

Implementing agency for Mawhoob competition

King Abdulaziz & His Companions Foundation for Giftedness and Creativity "Mawhiba", in cooperation with the Ministry of Education.

Target group

Saudi male and female students from grades six to the 10th grade.

Competition stages:

The competition will take place in two stages:

I: It is carried out remotely and the target is to participate in 15,000 students.

II: It is done in writing**** for students nominated from the first stage at the headquarters specified by the education departments to which the students are affiliated. (Exceptionally done this year remotely as well).

Competition

- 1- Pushing the educational field towards more efforts to develop mathematics and science education.
- 2- Discover the distinguished elements of our male and female students at an early stage to develop their capabilities.
- 3- Discovering distinguished teachers interested in the field of work on Olympic problems.
- 4- Spreading the culture of the Olympiad.
- 5- Raising the spirit of competition between the elements of the educational process.

Competition

The competition targets male and female students who have a passion for the scientific disciplines below, according to the following criteria:

1. The student must be a Saudi national.
2. The student must register in one scientific major only.
3. The student must register in the required specialization according to his grade, provided that the student is in one of the following grades at the beginning of the school year 1442H

Class	Subject					
	Mathematics.	Science	Physics	Chemistry	Biology	Informatics
6th Grade	✓	✓				
7th Grade	✓	✓				✓
8th Grade			✓	✓	✓	✓
9th Grade			✓	✓	✓	✓
10th Grade						✓

4. Complete the competition in its two phases.

Test Instructions

1. The only reference to the subjects of the competition is the mathematics and science syllabus from the Ministry of Education.
2. The student can access the system and take the pilot test directly after receiving the account activation message from the e-learning management system on the e-mail registered in the portal.
3. The test duration is 90 min only.
4. The calculator is allowed to be used in all stages of the competition except for mathematics majors.

(You can use the guide for the competition on our website to obtain samples of questions for each major)

The schedule for the 2020 talent competition

Program	Date		Length in Days	Scientific Disciplines
Register for gifted test	July 8, 2020	September 21, 2020	76	All Specialities
the first stage of Mawhoob test: "Performing an e-test"	September 28, 2020	September 28, 2020	1	Chemistry - Physics - Biology
	September 29, 2020	September 29, 2020	2	Mathematics - Informatics - Sciences
Announcing the results of the first phase	October 1, 2020	October 1, 2020		All Specialities
The second stage of the gifted test: "Performing an e-test"	October 4, 2020	October 4, 2020	2	Chemistry - Physics - Biology
	October 5, 2020	October 5, 2020		Mathematics - Informatics - Sciences
Announcement of phase II results	October 8, 2020	October 8, 2020	1	All Specialities

Exam entry

1. Availability of a computer operating system (Windows or IOS)
2. Connecting the computer device to the internet (making sure that no other device is connected to the network during the testing period to ensure the stability of the connection).
3. Only use **Google Chrome (Google Chrome)** and make sure that it is updated to the latest version **and not** to use any other browser to perform the test, including Microsoft Internet Explorer or Microsoft Edge or Safari.
4. Just keep the Google Chrome browser running and make sure that all other programs and windows are closed during the test.

Entry Instructions:

Enter on the link: <https://mawhiba.classera.com>

Then enter the login data as follows:

1. In the Username field: The email with which the student was registered in Mawhiba portal
2. In the password field: Password sent to you.
3. Click on the blue login button to enter the test

تسجيل الدخول

البريد الإلكتروني الذي تم تسجيل الطالب به في بوابة موهبة

اسم المستخدم

كلمة المرور المرسل لك.

الضغط هنا للدخول إلى الاختبار

تسجيل الدخول

تسجيل الدخول بحساب موهبة

If you encounter difficulty:

What to do if you encounter one of the following problems?

1. Machine restarting problem
2. Close the browser
3. Internet disconnection during the test

We hope that you will follow the steps below to get back for testing

1. Open the browser again and enter the test link <https://mawhiba.classera.com>
2. Then enter the login data
3. Press the start test button
4. Navigating between the test questions is by clicking on the Previous and Next button located in the top left of the screen, above the question in the Arabic interface, and in the upper right of the screen in the English interface.

Test Delivery

Upon completion of answering the test questions:

1. Click on the Submit button located at the bottom of the screen in the last question in the test.
2. When you click on it and confirm the delivery, the test will end and the result will appear to you, and you will not be able to enter it again.

Competition registration link:

<https://www.mawhiba.org/Ar/programs/competitions/mawhoob/Pages/Registration.aspx>

Note: The student who does not have an account in Mawhiba is directed to create an account through the link:

<https://login.mawhiba.org/Check/RegistrationPage.aspx>

And then register for the competition.

Important

1. Mawhiba website has introductory guides for each of the six contest tracks, and each guide contains several experimental questions that explain to the student the type of questions.

<https://www.mawhiba.org/Ar/programs/competitions/mawhoob/Pages/library.aspx>

2. 1- Ensure that you are connected to the internet before the test date.
3. Verify the test login data (username: the remote mail with which the student is registered in Mawhiba portal and the password that will be sent to you later)
4. 3- Entering the test site 15 min before the test time.
5. Avoid closing the browser during the test.
6. 5- Pay attention to the remaining time for the test.
7. 6- There is only one submission attempt for the test.
8. 7- Avoid clicking the Submit button unless you are sure that all questions have been answered and the test has been completed.



رحلة الطالب مع برنامج موهبة للأولمبيادات الدولية

مسابقة موهوب

فيزياء كيمياء أحياء معلوماتية
الصفوف ٨ و ٩ و (١٠ للمعلوماتية فقط)

رياضيات علوم
الصف ٦ و ٧

دورات
أساسية

دورات
أساسية



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Training exercises

Mathematics track

Important note:

In all of the following exercises, all of the mathematical expressions read from left to right, for example, $1 \times 3 + 5$, we read it, 1 times 3 plus 5

Exercise 1

In the example, Sami changed all signs + to \times and changed all \times signs to + signs and got the same answer. Which one could be his example?

- A $1 \times 3 + 5$
- B $3 \times 2 + 4$
- C $2 \times 3 + 2$
- D $3 \times 2 + 2$
- E $1 \times 2 + 3$

Exercise 2

Which of these is closest to 7 ?

- A 7.09
- B 6.918
- C 7.17
- D 6.7
- E 7.085

Exercise 3

What is the result of simplifying $(a : b) : (c : d)$?

- A $\frac{ad}{bc}$
- B $\frac{ac}{bd}$
- C $\frac{ab}{cd}$
- D $\frac{cd}{ab}$
- E $\frac{cb}{ad}$

Exercise 4

What is the product of multiplying the 40% of 2 by 60% of 2 ?

- A 96% of 2 .
- B of .
- C 48% of 2 .
- D of .
- E of .

Exercise 5

The numbers 1, 2, 3, 4, 5, 6, 7, 8 are divided into two groups, each containing 4 elements, such that the sum in both groups are equal. It is known that 1 and 3 are in the same group. Which number is also in that group?

- A 4
- B 5
- C 6
- D 7
- E 2

Exercise 6

The agency called to the hotel administration and reserved 5 rooms with 3 beds each and 1 room with 2 beds. Later, they counted that the final number of tourists is 25. How many 2 bedrooms they must reserve additionally?

- A 3
- B 4
- C 5
- D 6
- E 7

Exercise 7

What is the simplest form of $\left(1+\frac{1}{2}\right) \cdot \left(1-\frac{1}{3}\right) \cdot \left(1+\frac{1}{4}\right) \cdot \left(1-\frac{1}{5}\right) \cdot \left(1+\frac{1}{6}\right) \cdot \left(1-\frac{1}{7}\right) \cdot \left(1+\frac{1}{8}\right) \cdot \left(1-\frac{1}{9}\right)$?

- A 1
- B $\frac{1}{10}$
- C $\frac{9}{10}$
- D $\frac{7}{15}$
- E 10

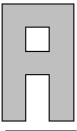
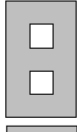

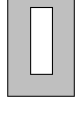
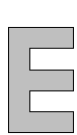
Exercise 8

A square board was divided into identical small square cells. Each cell was then colored alternately white or black with a chessboard pattern (this means that any two cells sharing one side would be different in color). If the number of black cells is 25 . What is the number of cells in a row?

- A 3
- B 4
- C 5
- D 6
- E 7

Exercise 9

Which of the following five shapes can be cut into four pieces by a single straight line?

- A 
- B 
- C 
- D 
- E 

Exercise 10

Jamal writes down a sequence of six integers. The rule he uses is, “after the first three terms, each term is the sum of the three previous terms.” His sequence is $—, —, —, 8, 13, 25$. What is his first term?

- A 0
- B 1
- C 2
- D 3
- E 4

Exercise 11

Ahmad and Badr hosted the event. It occurred that Ahmad knows 80% of guests and Badr knows 60% of them. Each guest knows either Ahmad or Badr and exactly 6 of them know both Ahmad and Badr. Find the number of guests.

- A 5
- B 10
- C 12
- D 15
- E 20

Exercise 12

Fahd has written a number on the paper. Then he multiplied it either by 5 or 6, then added either-or 6, and finally subtracted either 5 or 6. As result he got 73. Find the original number.

- A 11
- B 12
- C 13
- D 14
- E 15

Exercise 13

To paint a box of dimensions $2 \times 2 \times 2$ it's required a 2 gram of paint. How many grams of paint is required to paint a box of dimensions $6 \times 6 \times 6$?

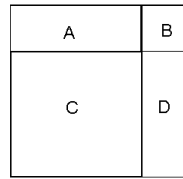
- A 18
- B 3
- C 8
- D 6
- E 10

Exercise 14



How many triangles we can draw so that their vertices lie on the points shown in the figure?

- A 4
- B 6
- C 8
- D 9
- E 11



The large square is divided into 4 parts. B is a square with perimeter 20 cm and C is a square with perimeter 80 cm. What is the area of the large square in square cm?

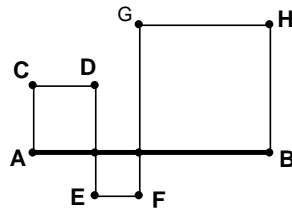
- A 100
- B 81
- C 144
- D 225
- E 625

Exercise 16

What is the number of 4 digit positive integer, such that the sum of 1st and 3rd digits is bigger than 14, and the sum of 2nd and 4th digits is less than 3 ?

- A 10
- B 12
- C 15
- D 25
- E 60

Exercise 17



Let 3 squares drawn in the picture. If the length AB is 10 cm. What is the length of $ACDEFGHB$ in cm?

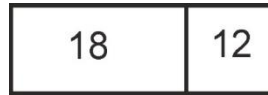
- A 20
- B 25
- C 30
- D 40
- E 100

Exercise 18

Two numbers are given. If we subtract half of the smaller number from both of them, then we get 2 numbers the ratio between them is equal to 3 . Find the ratio of the smaller number to the bigger one for the original numbers

- A $\frac{1}{2}$
- B $\frac{1}{4}$
- C $\frac{2}{3}$
- D $\frac{3}{4}$
- E $\frac{4}{5}$

Exercise 19



The large rectangle has a perimeter of 24 cm, is divided into two rectangles of perimeters 18 cm and 12 cm as shown. What is the area of the large rectangle in square cm?

- A 24
- B 27
- C 30
- D 36
- E 40

Exercise 20

What is the last digit of the smallest positive integer whose digits add to 2019?

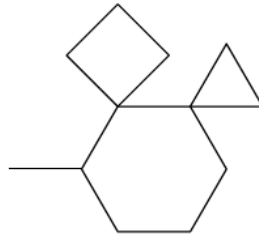
- A 1
- B 4
- C 6
- D 8
- E 9

Exercise 21

A, B, and C compete on 100 meter running. When A reached the endpoint, 10 m was remaining for B. When B reached the endpoint, 10 m was remaining for C. How many meters were remaining for C, when A reached the endpoint?

- A 20
- B 19
- C 18
- D 21
- E 15

Exercise 22



Each edge in the diagram has a length 1 cm. What is the length of the longest path (in cm) that can be followed along the edges, starting at a vertex and without revisiting any vertex?

- A 7
- B 8
- C 9
- D 10
- E 11

Exercise 23

$$\begin{array}{r} T R A P \\ \times \quad \quad 9 \\ \hline P A R T \\ \hline \end{array}$$

In the multiplication shown in the diagram, T, R, A, and P are all different digits. What is the value of R?

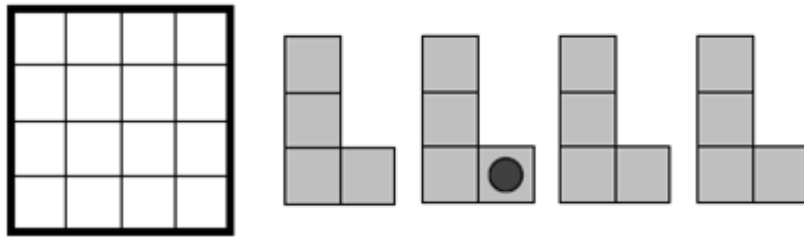
- A 0
- B 1
- C 5
- D 8
- E 9

Exercise 24

A particular integer is the smallest multiple of 72, each of whose digits is either 0 or 1. How many digits does this integer have?

- A 4
- B 6
- C 8
- D 12
- E 13

Exercise 25



All four L-shapes shown in the diagram are to be placed in the 4 by 4 grid so that all sixteen cells are covered and there is no overlap. Each piece can be rotated or flipped before being placed and the black dot is visible from both sides. How many of the 16 cells of the grid could contain the black dot?

- A 4
- B 7
- C 8
- D 12
- E 16

Exercise 26

The faces of a cube are painted so that any two faces which have an edge in common are painted different colors. What is the smallest number of colors required?

- A 2
- B 3
- C 4
- D 5
- E 6

Exercise 27

	1			
			m	
	2	3		
4				
			5	

The diagram shows a 5 by 5 grid comprising 25 squares. Each square is filled with number 1, 2, 3, 4 or 5 in such a way that no row, column, or the two main diagonal lines contain the same number more than once. Find the value of m .

- A 1
- B 2
- C 3
- D 4
- E 5

Exercise 28

Noting that $0.\overline{29} = \frac{29}{99}$ (where $0.\overline{29} = 0.292929\dots$). What is the value of $0.\overline{729}$ is?

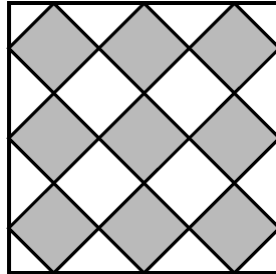
- A $\frac{361}{450}$
- B $\frac{183}{225}$
- C $\frac{72}{99}$
- D $\frac{361}{495}$
- E $\frac{729}{999}$

Exercise 29

Mr. Adel has a lot of tables and chairs in his house. Each rectangular table seats eight people and each round table seats five people. What is the smallest number of tables he will need to use to seat 35 guests and himself, without any of the seating around these tables remaining unoccupied?

- A 4
- B 5
- C 6
- D 7
- E 8

Exercise 30



In the diagram, the small squares are all the same size. What fraction of the large square is shaded?

- A $\frac{9}{20}$
- B $\frac{9}{16}$
- C $\frac{3}{7}$
- D $\frac{1}{2}$
- E $\frac{2}{3}$

Answer Key



Answer Key

Mathematics track

Question	Correct Answer
1	C
2	B
3	A
4	C
5	C
6	B
7	A
8	E
9	E
10	D
11	D
12	B
13	A
14	D
15	E
16	E
17	C
18	A
19	B
20	E
21	B
22	D
23	A
24	D
25	E
26	B
27	A
28	D
29	C
30	D

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prepared by

Dr. Sultan Al-Safwat Al-Tanani Tariq Salama

Done