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TIMSS
Advanced
2015

TIMSS Advanced 2015 Curriculum Questionnaire— Mathematics

Advanced



Mathematics



TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

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TIMSS Advanced 2015 Curriculum Questionnaire

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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics

TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics

The TIMSS Advanced 2015 Curriculum Questionnaires are designed to collect basic information about the structure of the education system as well as the organization, content, and implementation of the advanced mathematics and physics curricula in each country. There are separate questionnaires for Advanced Mathematics and Physics.

The questionnaires should be completed by the National Research Coordinators, drawing on the expertise of curriculum specialists and educators. Please submit the questionnaires no later than **August 31, 2015**.

To begin this questionnaire, please click on the "Next" button. When navigating through the questionnaire, make sure to confirm your responses by clicking on the "Next" or "Previous" button. To go to a particular section or item, please click on the corresponding link in the "Table of Contents".

If you have any questions about the content of this questionnaire, please contact the TIMSS & PIRLS International Study Center at Boston College: timss@bc.edu

If you have any technical questions on how to complete this questionnaire, please contact the IEA Data Processing & Research Center (DPC): timss@iea-dpc.de

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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics - About the Advanced Mathematics Programs (Tracks)

About the Advanced Mathematics Programs (Tracks)

This questionnaire refers to the national advanced mathematics curriculum that was in effect for the students assessed in TIMSS Advanced 2015—the curriculum that covers advanced mathematics instruction for the majority of students in these programs or tracks. If you do not have a national curriculum, please summarize for your state or provincial curricula.

1. A. Describe the advanced mathematics programs/tracks assessed by TIMSS Advanced 2015. How do the programs/tracks fit into the overall curriculum from the first grade through the final year? How do they relate with programs at the university level, if at all (e.g., is participation a prerequisite for studying certain fields such as engineering or medicine)?

Examples of information reported for TIMSS Advanced 2008 can be found in the second column of Exhibit 1.1 on pages 26-27 of the 2008 report. [Click here to view](#)

B. How many years are students in these programs/tracks, and at which grade do they start?

Examples of information reported for TIMSS Advanced 2008 can be found in the third column of Exhibit 1.1 on pages 26-27 of the 2008 report. [Click here to view](#)

C. What is the total amount of class time in advanced mathematics for the students in the advanced mathematics programs/tracks?

Examples of information reported for TIMSS Advanced 2008 can be found in the fourth column of Exhibit 1.1 on pages 26-27 of the 2008 report. [Click here to view](#)

hours per year (1 hour = 60 minutes)

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Criteria for Admission

2. A. What are the criteria for admission to these advanced mathematics programs/tracks?

Examples of information reported for TIMSS Advanced 2008 can be found in the fifth column of Exhibit 1.1 on pages 26-27 of the 2008 report. [Click here to view](#)

B. Are there any prerequisite courses for students taking these advanced mathematics programs/tracks?

Check **one** circle only.

- Yes
- No

If Yes...

Please explain:

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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics - Advanced Mathematics Curriculum

Advanced Mathematics Curriculum

3. A. Summarize the mathematics curriculum that was in effect for the students assessed in TIMSS Advanced 2015. (750 words)

If applicable, please reference your country's curricular documents.

B. In what year was the advanced mathematics curriculum introduced?

Examples of information reported for TIMSS Advanced 2008 can be found in the second column of Exhibit 1.3 on page 33 of the 2008 report. [Click here to view](#)

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C. Is the advanced mathematics curriculum currently being revised?

Examples of information reported for TIMSS Advanced 2008 can be found in the third column of Exhibit 1.3 on page 33 of the 2008 report. [Click here to view](#)

Check **one** circle only.

- Yes
- No

If Yes...

Please explain:

If No...

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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics - Instructional Materials and Use of Technology

Instructional Materials and Use of Technology

4. Is there a process for approving the advanced mathematics instructional materials?

Check *one* circle only.

- Yes
 No

If Yes...

Please describe the process, and what materials (e.g., textbooks, workbooks, online materials) must be approved through this process:

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5. A. Does the curriculum contain statements/policies about the use of technology (e.g., computers, tablets, calculators) in advanced mathematics instruction?

Check *one circle only*.

- Yes
- No

If Yes...

What are the statements/policies?

Comments:

B. Does the curriculum contain statements/policies about student use of technological aids (e.g., computers, tablets, calculators) in advanced mathematics tests or examinations?

Check *one circle only*.

- Yes
- No

If Yes...

What are the statements/policies?

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Examinations

6. A. Does an educational authority in your country (e.g., National Ministry of Education) administer examinations to students in these advanced mathematics programs/tracks that have consequences for individual students, such as entry to a university?

Check **one** circle only.

- Yes
- No

If Yes....

B. Please describe the secondary school grades at which the exams are given to students in each of these programs/tracks and the purpose of each exam.

Examples of information reported for TIMSS Advanced 2008 can be found in the third and fifth columns of Exhibit 1.6 on pages 38-39 of the 2008 report. [Click here to view](#)

C. What is the nature and format of the examinations, and do they have an oral component?

Examples of information reported for TIMSS Advanced 2008 can be found in the fourth column of Exhibit 1.6 on pages 38-39 of the 2008 report. [Click here to view](#)

D. Additional comments on the examination system

Examples of information reported for TIMSS Advanced 2008 can be found in the sixth column of Exhibit 1.6 on pages 38-39 of the 2008 report. [Click here to view](#)

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Advanced Mathematics Topics Covered

7. According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)?

If part of a topic does not apply [e.g., logarithmic expressions in part A topic (a)], please explain in the comment field.

Check **one** circle for each line.

A. Algebra

	Yes	No
a) Operations with exponential, logarithmic, polynomial, rational, and radical expressions	<input type="radio"/>	<input type="radio"/>
b) Operations with complex numbers	<input type="radio"/>	<input type="radio"/>
c) Evaluating algebraic expressions (e.g., exponential, logarithmic, polynomial, rational, and radical)	<input type="radio"/>	<input type="radio"/>
d) The nth term of arithmetic and geometric sequences and the sums of finite and infinite series	<input type="radio"/>	<input type="radio"/>
e) Linear, simultaneous, and quadratic equations and inequalities; radical equations, logarithmic, and exponential equations	<input type="radio"/>	<input type="radio"/>
f) Slopes, y-axis intercepts, and points of intersection of straight lines	<input type="radio"/>	<input type="radio"/>
g) Equivalent representations of functions, including composite functions, as ordered pairs, tables, graphs, formulas, or words	<input type="radio"/>	<input type="radio"/>
h) Properties of functions including domain and range	<input type="radio"/>	<input type="radio"/>

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7. (continued)

According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)?

If part of a topic does not apply [e.g., logarithmic expressions in part A topic (a)], please explain in the comment field.

Check **one** circle for each line.

B. Calculus

	Yes	No
a) Limits of functions	<input type="radio"/>	<input type="radio"/>
b) Conditions for continuity and differentiability of functions	<input type="radio"/>	<input type="radio"/>
c) Differentiation of functions (including polynomial, exponential, logarithmic, trigonometric, rational, and radical functions); differentiation of products, quotients, and composite functions	<input type="radio"/>	<input type="radio"/>
d) Using derivatives to solve problems (e.g., in optimization and rates of change)	<input type="radio"/>	<input type="radio"/>
e) Using first and second derivatives to determine slope and local extrema of functions	<input type="radio"/>	<input type="radio"/>
f) Using derivatives to determine points of inflection of functions	<input type="radio"/>	<input type="radio"/>
g) Integrating functions (including polynomial, exponential, trigonometric, and rational functions); evaluating definite integrals, including calculation of areas	<input type="radio"/>	<input type="radio"/>

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7. (continued)

According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)?

If part of a topic does not apply [e.g., logarithmic expressions in part A topic (a)], please explain in the comment field.

*Check **one** circle for each line.*

C. Geometry

	Yes	No
a) Properties of geometric figures in two and three dimensions	<input type="radio"/>	<input type="radio"/>
b) Properties of vectors and their sums and differences	<input type="radio"/>	<input type="radio"/>
c) Trigonometric properties of triangles (sine, cosine, and tangent)	<input type="radio"/>	<input type="radio"/>
d) Trigonometric functions and their graphs	<input type="radio"/>	<input type="radio"/>

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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics - Advanced Mathematics Topics Covered

8. How is the implementation of the advanced mathematics curriculum evaluated?

Check one circle for each line.

	Yes	No
a) Visits by inspectors	<input type="radio"/>	<input type="radio"/>
b) Research programs	<input type="radio"/>	<input type="radio"/>
c) School self-evaluation	<input type="radio"/>	<input type="radio"/>
d) National or regional examinations	<input type="radio"/>	<input type="radio"/>
e) Other Please specify below:	<input type="radio"/>	<input type="radio"/>

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Recruitment to TIMSS Advanced Programs/Tracks

9. A. Does your country sponsor national programs to encourage students to study advanced mathematics?

Check one circle only.

Yes
 No

If Yes...

B. Does your country implement any of the following programs to promote the study of advanced mathematics?

Check one circle for each line.

	Yes	No
a) School partnerships with industry	<input type="radio"/>	<input type="radio"/>
b) School collaborations with universities	<input type="radio"/>	<input type="radio"/>
c) Contests/competitions in advanced mathematics	<input type="radio"/>	<input type="radio"/>
d) Other	<input type="radio"/>	<input type="radio"/>

Please specify:

If applicable, please describe the programs implemented in your country to promote the study of advanced mathematics:

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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics - Advanced Mathematics Teachers

Advanced Mathematics Teachers

10. Describe the national requirements for being a teacher of the advanced mathematics programs/tracks being assessed in TIMSS Advanced.

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11. Does your country experience any difficulties recruiting or retaining advanced mathematics teachers of students at the end of upper secondary school?

Check *one* circle only.

- Yes
 No

If Yes...

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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics

This completes the TIMSS Advanced 2015 Curriculum Questionnaire - Advanced Mathematics Module

To submit your completed questionnaire, please click the Finish button.

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Mathematics



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