Executive Summary

With numeracy skills needed more than ever in the work place, today's students must be able to compute fluently, engage in logical reasoning and use mathematics to tackle novel problems. However, PISA 2012 results show that only a minority of 15-year-old students in most countries grasp and can work with core mathematics concepts. On average, less than 30% of students across OECD countries understand the concept of an arithmetic mean, while less than 50% of students can work with the concept of a polygon.

"Opportunity to learn" refers to the content taught in the classroom and the time a student spends learning this content. Not all students, not even those in the same school, experience equal opportunities to learn. Reducing inequalities in access to mathematics is not an impossible task. PISA results show that performance disparities between socio-economically advantaged and disadvantaged students are largely linked to differences in students' familiarity with mathematics. Thus, raising disadvantaged students' opportunities to learn mathematics concepts and processes may help reduce inequalities and improve the average level of performance. This objective can be achieved through a more focused and coherent curriculum, a thorough evaluation of the effects of policies and practices that sort students by ability, and stronger support for teachers who teach heterogeneous classes.

Tracking and ability grouping affect students' exposure to mathematics and teachers' practices

Across OECD countries, socio-economic differences among students and schools account for around 9% – and in some countries, as much as 20% – of the variation in familiarity with mathematics concepts. Certain system-level policies, such as between-school tracking, academic selectivity or transferring students from one school to another because of low achievement or poor behaviour, are also associated with more unequal access to mathematics content. PISA 2012 results show that, across OECD countries, around 54% of the international differences in the impact of students' and schools' socio-economic status on students' familiarity with mathematics are explained by system-level differences in the age at which students are tracked into vocational or academic programmes.

Some countries have replaced between-school tracking with ability grouping within schools. Across OECD countries, more than 70% of students attend schools whose principal reported that students are grouped by ability for mathematics classes. But this type of ability grouping can reduce opportunities to learn for disadvantaged students just as much as between-school tracking does.

Postponing between-school tracking and reducing ability-grouping can reduce the influence of socio-economic status on students' opportunities to learn but it has an impact on teachers: they must be prepared to teach more heterogeneous classes. Teachers are generally committed to providing equal education opportunities: across OECD countries, about 70% of students attend schools where teachers believe it is best to adapt academic standards to the students' levels and needs. However, adapting instruction to each student's skills and needs while advancing learning for all students in the classroom is not easy. Teachers need more support to use pedagogies, such as flexible grouping or co-operative learning strategies, that increase learning opportunities for all students in mixed-ability classes.

Exposure to mathematics concepts and procedures matters for performance, but is not sufficient for higher-order thinking skills

PISA data confirm previous evidence that the effectiveness of instruction time closely depends on the quality of the disciplinary climate in the classroom. But, more than the amount of time, the content of instruction matters for performance.

Greater exposure to pure mathematics tasks and concepts (such as linear and quadratic equations) has a strong relationship with higher performance in PISA, even after accounting for the fact that better-performing students may attend schools that offer more mathematics instruction. In contrast, exposure to simple applied mathematics problems (such as working out from a train timetable how long it would take to get from one place to another) has a weaker relationship with student performance. This suggests that simply including some references to the real-world in mathematics instruction does not automatically transform a routine task into a good problem. Using well-designed, challenging problems in mathematics classes can have a large impact on students' performance.

The mastery of core concepts and procedures is a necessary component of mathematics learning, but is hardly sufficient for solving the most complex problems. PISA data show that frequent exposure to equations and formulas can make a difference to students tackling tasks that state the main terms of the problem and that require students to apply procedures they learned at school. But exposure to these procedures does not necessarily teach students how to think and reason mathematically. Introducing problem-solving strategies – such as teaching students how to question, make connections and predictions, conceptualise and model complex problems – requires time and is more challenging in disadvantaged schools. Restructured textbooks, teaching materials and dedicated training can help minimise the time needed to incorporate these teaching practices into an already full schedule.

Exposure to complex mathematics can influence students' attitudes

Exposure to relatively complex mathematics topics may undermine the self-beliefs of students who do not feel up to the task, while at the same time improving the attitudes and self-beliefs of those who are relatively well-prepared and ready to be challenged. On average across OECD countries, exposure to more complex mathematics concepts is associated with lower self-concept/higher anxiety among low-performing students, and with higher self-concept/lower anxiety among high-performing students. PISA finds that practices such as encouraging students to work in small groups, providing extra help to students when they need it, or reducing the mismatch between what is taught and what is assessed can improve students' self-beliefs and problem-solving skills. The data also show that students become more engaged with mathematics when they use computers in class. Moreover teachers can work with parents to improve students' attitudes towards mathematics, as PISA data suggest that parents can unknowingly transmit mathematics anxiety to their children.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

■ Table 0.1 [Part 1/2] ■
SNAPSHOT OF OPPORTUNITIES TO LEARN MATHEMATICS

Countries/economies where instruction time/exposure is **above** the OECD average
Countries/economies where instruction time/exposure is not statistically different from the OECD average
Countries/economies where instruction time/exposure is **below** the OECD average

	Time spent per week in regular school lessons in mathematics (minutes)		Exposure to applied mathematics		Exposure to pure mathematics	
	2012	Change between 2003 and 2012	Percentage of students who reported that they frequently encounter, at school, problems like "Working out from a train timetable how long it would take to get from one place to another"	Index	Percentage of students who reported that they frequently encounter, at school, equations like "$6x^2 + 5 = 29$"	Index
	Minutes	Dif.	%	Mean index	%	Mean index
OECD average	218	**13**	17.1	0.00	61.6	0.00
Chile	398	m	28.1	-0.03	55.4	-0.10
Canada	314	**91**	13.7	-0.10	59.5	-0.09
United Arab Emirates	311	m	18.1	0.07	58.4	-0.10
Portugal	288	**93**	7.3	-0.37	48.0	-0.35
Singapore	288	m	12.4	0.31	74.8	0.33
Peru	287	m	20.9	0.13	62.9	0.11
Tunisia	276	**26**	14.3	-0.20	46.7	-0.30
Macao-China	275	3	11.9	-0.11	68.3	0.21
Shanghai-China	269	m	14.2	0.18	67.0	0.06
Argentina	269	m	15.7	-0.16	50.4	-0.25
Hong Kong-China	268	-2	6.5	-0.14	64.4	0.15
Colombia	263	m	21.5	-0.16	42.5	-0.39
Qatar	259	m	26.1	0.09	50.1	-0.28
Israel	254	m	15.2	-0.39	65.4	0.03
United States	254	**33**	11.4	-0.08	65.5	0.09
Mexico	253	**18**	17.7	0.18	56.7	-0.03
Iceland	244	**-10**	23.6	0.20	72.3	0.23
Chinese Taipei	243	m	8.7	-0.11	59.6	-0.04
New Zealand	241	1	13.4	-0.05	48.4	-0.27
Australia	236	**6**	15.7	-0.10	51.1	-0.17
Japan	235	**18**	17.5	-0.18	69.4	0.19
Italy	232	**19**	11.7	-0.42	71.7	0.22
United Kingdom	230	m	18.8	0.03	62.0	0.02
Jordan	227	m	24.6	0.30	55.2	-0.22
Viet Nam	227	m	8.7	-0.23	68.0	0.17
Denmark	224	**18**	25.0	0.27	46.3	-0.37
Latvia	224	**10**	11.2	0.02	59.9	-0.01
Estonia	223	m	18.1	0.07	62.5	0.03
Russian Federation	222	**15**	25.4	0.18	75.0	0.29
Belgium	217	**21**	12.6	-0.23	62.6	-0.09
Brazil	215	4	25.8	0.05	38.1	-0.56
Korea	213	**-33**	24.3	0.40	79.4	0.43

Notes: The *index of exposure to applied mathematics* refers to student-reported experience with applied tasks at school, such as working out from a train timetable how long it would take to get from one place to another.
The *index of exposure to pure mathematics* measures student-reported experience with mathematics tasks at school requiring knowledge of algebra (linear and quadratic equations).
The OECD average of the time spent per week in regular school lessons in mathematics in 2012 is based on all OECD countries. The corresponding OECD average reported in Table 1.6 is based on the OECD countries that participated in both PISA 2003 and PISA 2012.
Statistically significant values are indicated in bold.
Countries/economies are ranked in descending order of the time spent in regular mathematics lessons.
Source: OECD, PISA 2012 Database, Tables 1.6, 1.9a and 1.9b.

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■ Table 0.1 [Part 2/2] ■
SNAPSHOT OF OPPORTUNITIES TO LEARN MATHEMATICS

Countries/economies where instruction time/exposure is **above** the OECD average
Countries/economies where instruction time/exposure is not statistically different from the OECD average
Countries/economies where instruction time/exposure is **below** the OECD average

	Time spent per week in regular school lessons in mathematics (minutes)		Exposure to applied mathematics		Exposure to pure mathematics	
	2012	Change between 2003 and 2012	Percentage of students who reported that they frequently encounter, at school, problems like "Working out from a train timetable how long it would take to get from one place to another"	Index	Percentage of students who reported that they frequently encounter, at school, equations like "$6x^2 + 5 = 29$"	Index
	Minutes	Dif.	%	Mean index	%	Mean index
OECD average	218	**13**	17.1	0.00	61.6	0.00
Liechtenstein	211	-5	13.8	0.01	76.2	0.22
Spain	210	**34**	17.7	0.17	74.1	0.27
Indonesia	209	**-23**	20.2	0.05	53.5	-0.15
Greece	209	**22**	12.8	-0.41	67.5	0.05
Costa Rica	208	m	23.3	-0.37	57.1	-0.06
France	207	-1	15.9	-0.05	64.9	0.02
Switzerland	207	8	17.7	-0.02	62.7	0.01
Thailand	206	**-18**	11.6	0.40	53.0	-0.09
Luxembourg	205	**4**	20.0	-0.28	52.8	-0.25
Malaysia	201	m	10.7	0.00	59.8	-0.02
Norway	199	**33**	17.8	0.18	57.8	0.00
Poland	198	**-7**	21.2	0.48	61.8	0.09
Germany	197	**14**	15.4	0.06	68.9	0.13
Cyprus[1]	189	m	22.5	-0.17	60.4	-0.04
Ireland	189	-2	20.0	0.14	68.1	0.14
Kazakhstan	183	m	35.9	0.51	68.6	0.16
Czech Republic	182	**14**	11.0	-0.25	54.2	-0.09
Sweden	182	**17**	22.1	0.33	45.0	-0.25
Slovak Republic	181	**-18**	15.4	0.05	57.1	-0.11
Finland	175	**19**	21.1	0.23	61.3	0.00
Turkey	172	**-28**	17.0	-0.17	58.8	-0.10
Lithuania	172	m	16.6	0.19	65.3	0.13
Albania	171	m	16.6	0.22	69.5	0.15
Netherlands	171	**21**	6.8	0.22	64.6	-0.01
Romania	169	m	19.1	0.10	60.6	-0.07
Slovenia	160	m	17.7	0.04	67.2	0.20
Austria	156	**-10**	19.0	-0.03	63.8	-0.03
Uruguay	156	**-27**	12.5	-0.51	58.0	-0.06
Serbia	154	m	19.9	-0.24	60.5	-0.08
Hungary	150	**-13**	19.9	0.11	67.4	0.14
Croatia	147	m	17.6	-0.04	67.8	0.19
Montenegro	142	m	30.1	0.06	59.8	-0.09
Bulgaria	134	m	19.3	0.00	65.4	0.06

1. Note by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".
Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

Notes: The *index of exposure to applied mathematics* refers to student-reported experience with applied tasks at school, such as working out from a train timetable how long it would take to get from one place to another.
The *index of exposure to pure mathematics* measures student-reported experience with mathematics tasks at school requiring knowledge of algebra (linear and quadratic equations).
The OECD average of the time spent per week in regular school lessons in mathematics in 2012 is based on all OECD countries. The corresponding OECD average reported in Table 1.6 is based on the OECD countries that participated in both PISA 2003 and PISA 2012.
Statistically significant values are indicated in bold.
Countries/economies are ranked in descending order of the time spent in regular mathematics lessons.
Source: OECD, PISA 2012 Database, Tables 1.6, 1.9a and 1.9b.
StatLink http://dx.doi.org/10.1787/888933377644

■ Table 0.2 [Part 1/2] ■
SNAPSHOT OF FAMILIARITY WITH MATHEMATICS

Countries/economies where familiarity with mathematics is **above** the OECD average
Countries/economies where familiarity with mathematics is not statistically different from the OECD average
Countries/economies where familiarity with mathematics is **below** the OECD average

	Familiarity with mathematics						
		Arithmetic mean		Linear equation		Vectors	
	Index	Percentage of students who have never heard the concept	Percentage of students who know well/ understand the concept	Percentage of students who have never heard the concept	Percentage of students who know well/ understand the concept	Percentage of students who have never heard the concept	Percentage of students who know well/ understand the concept
	Mean index	%	%	%	%	%	%
OECD average	0.00	30.8	29.4	12.8	41.8	34.9	20.3
Korea	1.34	52.4	13.2	0.9	69.0	34.4	2.7
Shanghai-China	1.12	7.4	68.3	50.1	8.5	7.1	74.7
Chinese Taipei	0.95	9.6	46.2	21.1	23.9	19.6	19.4
Spain	0.82	20.0	34.9	12.3	41.8	31.3	28.5
Japan	0.79	1.2	76.1	1.6	69.1	31.6	9.6
Macao-China	0.52	22.7	35.7	1.3	72.3	33.3	20.8
Hong Kong-China	0.50	15.8	44.7	31.7	28.4	45.1	13.0
Viet Nam	0.43	20.1	25.6	64.9	4.2	5.1	60.4
Latvia	0.41	5.2	62.9	3.3	49.1	43.4	8.9
Estonia	0.35	4.8	59.2	1.0	63.7	39.7	6.3
Hungary	0.33	33.4	19.4	5.4	52.8	7.2	45.6
Cyprus[1]	0.31	15.0	38.1	26.5	23.0	7.6	41.0
Greece	0.31	9.5	44.5	18.4	23.4	5.6	46.4
Czech Republic	0.26	8.7	52.3	2.7	59.5	48.6	11.8
Belgium	0.11	33.2	28.5	29.7	21.9	25.2	36.6
Finland	0.11	67.0	3.3	7.9	33.4	60.1	2.6
Turkey	0.10	4.7	49.3	6.4	26.4	4.6	42.1
Israel	0.10	20.6	46.0	16.4	53.9	65.7	10.0
France	0.09	38.0	21.3	10.5	44.3	24.8	48.9
Germany	0.09	50.4	17.3	6.2	63.6	42.0	14.4
Austria	0.05	53.4	14.8	10.9	51.3	28.5	30.1
Liechtenstein	0.04	60.0	10.8	16.2	50.7	38.3	27.3
United States	0.03	42.5	18.7	3.2	56.8	31.5	12.7
Singapore	0.02	35.8	26.0	2.4	62.6	15.1	44.0
Iceland	0.02	30.1	32.5	53.0	8.2	73.6	2.8
Slovak Republic	-0.04	11.7	47.1	4.5	57.0	51.1	12.3
Italy	-0.04	10.3	56.6	19.5	36.8	17.9	36.2
Slovenia	-0.06	15.5	39.6	2.2	64.2	17.1	28.9
Russian Federation	-0.07	2.3	74.2	1.5	70.8	2.8	65.1
Uruguay	-0.07	54.8	6.4	18.7	26.4	14.9	35.0
United Arab Emirates	-0.08	13.7	52.9	8.1	55.0	29.9	27.1
Canada	-0.10	45.3	14.6	5.8	55.6	32.4	13.2
Lithuania	-0.12	17.7	36.8	15.1	35.1	57.9	3.0

1. See note 1 under Snapshot Table 0.1 [Part 2/2].
Note: The *index of familiarity with mathematics* is based on students' responses to 13 items measuring students' self-reported familiarity with mathematics concepts (such as exponential function, divisor, quadratic function, etc.).
Countries/economies are ranked in descending order of the index of familiarity with mathematics.
Source: OECD, PISA 2012 Database, Tables 1.7 and 1.8.
StatLink http://dx.doi.org/10.1787/888933377650

■ Table 0.2 [Part 2/2] ■
SNAPSHOT OF FAMILIARITY WITH MATHEMATICS

Countries/economies where familiarity with mathematics is **above** the OECD average
Countries/economies where familiarity with mathematics is not statistically different from the OECD average
Countries/economies where familiarity with mathematics is **below** the OECD average

	Familiarity with mathematics						
		Arithmetic mean		Linear equation		Vectors	
	Index	Percentage of students who have never heard the concept	Percentage of students who know well/ understand the concept	Percentage of students who have never heard the concept	Percentage of students who know well/ understand the concept	Percentage of students who have never heard the concept	Percentage of students who know well/ understand the concept
	Mean index	%	%	%	%	%	%
OECD average	0.00	30.8	29.4	12.8	41.8	34.9	20.3
Croatia	-0.14	9.8	49.3	1.4	72.0	3.5	55.9
Switzerland	-0.18	51.0	11.1	21.1	31.2	45.5	17.3
Portugal	-0.18	30.9	20.9	16.8	24.5	8.4	47.3
Bulgaria	-0.19	9.7	53.7	5.4	57.5	9.7	40.7
Serbia	-0.26	12.6	38.0	1.6	64.2	3.2	58.0
Poland	-0.27	1.8	65.7	20.0	15.8	16.3	21.6
Chile	-0.27	28.8	17.4	4.9	49.7	16.5	30.4
Denmark	-0.31	10.4	42.1	11.0	38.8	54.1	3.3
United Kingdom	-0.32	40.3	18.6	11.3	35.9	18.4	27.0
Australia	-0.34	43.2	15.5	9.2	47.1	31.1	12.9
Ireland	-0.34	38.6	22.1	11.8	38.0	58.1	4.0
Romania	-0.34	5.6	54.3	5.3	52.7	7.4	39.8
Jordan	-0.38	7.8	66.1	9.2	60.3	33.1	18.7
Costa Rica	-0.39	46.4	12.3	27.3	23.7	39.7	25.2
Tunisia	-0.40	12.2	46.3	47.6	12.3	33.2	19.6
Colombia	-0.42	21.9	18.2	12.6	28.4	25.5	26.4
Netherlands	-0.43	27.5	25.0	10.2	42.5	58.0	8.2
Montenegro	-0.47	24.9	22.4	3.9	59.5	9.0	44.6
Kazakhstan	-0.48	5.8	53.6	6.9	47.8	5.5	54.4
Mexico	-0.48	18.7	17.9	9.0	30.0	27.2	10.5
Sweden	-0.49	65.3	3.8	39.0	8.6	71.5	3.4
New Zealand	-0.53	49.2	10.2	13.0	36.7	34.0	13.0
Peru	-0.56	15.2	25.1	7.1	35.4	29.6	18.8
Brazil	-0.57	29.1	17.5	28.5	12.9	36.8	11.4
Luxembourg	-0.58	56.7	10.4	27.8	27.7	39.0	28.3
Argentina	-0.60	58.7	7.5	27.6	23.8	38.6	19.0
Albania	-0.62	5.6	52.7	6.6	42.6	3.1	58.3
Thailand	-0.72	5.4	31.0	3.4	34.9	16.3	22.8
Qatar	-0.83	19.1	35.9	15.3	44.3	27.8	24.5
Malaysia	-0.85	54.3	3.9	9.1	35.7	30.1	10.2
Indonesia	-0.90	5.0	27.2	8.6	19.6	20.2	11.1
Norway	m	m	m	m	m	m	m

Note: The *index of familiarity with mathematics* is based on students' responses to 13 items measuring students' self-reported familiarity with mathematics concepts (such as exponential function, divisor, quadratic function, etc.).
Countries/economies are ranked in descending order of the index of familiarity with mathematics.
Source: OECD, PISA 2012 Database, Tables 1.7 and 1.8.
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■ Table 0.3 [Part 1/2] ■
SNAPSHOT OF VARIATION IN OPPORTUNITIES TO LEARN MATHEMATICS, BY CHARACTERISTICS OF STUDENTS AND SCHOOLS

Countries/economies where the strength of the relationship between socio-economic status and familiarity with mathematics is **below** the OECD average

Countries/economies where the strength of the relationship between socio-economic status and familiarity with mathematics is not statistically different from the OECD average

Countries/economies where the strength of the relationship between socio-economic status and familiarity with mathematics is **above** the OECD average

	Percentage of variation in familiarity with mathematics explained by students' and schools' socio-economic profile	Difference between socio-economically advantaged and disadvantaged students				Familiarity with mathematics (index)		
		Time spent per week in regular school lessons in mathematics (minutes)	Exposure to applied mathematics (index)	Exposure to pure mathematics (index)	Familiarity with mathematics (index)	Difference (boys-girls)	Difference (non-immigrant - immigrant)	Difference (attended pre-primary education - not attended)
	%	Dif.	Dif.	Dif.	Dif.	Dif.	Dif.	Dif.
OECD average	8.5	**7**	**0.23**	**0.44**	**0.45**	**-0.15**	**0.17**	**0.29**
Liechtenstein	24.5	-15	**0.36**	0.28	**0.60**	0.06	**0.48**	c
Hungary	21.4	3	0.07	**0.41**	**0.85**	**-0.25**	-0.07	c
Austria	18.6	-3	**0.11**	**0.51**	**0.77**	-0.07	**0.30**	0.23
Germany	16.3	-11	**0.11**	**0.44**	**0.61**	**-0.12**	**0.29**	**0.37**
Slovenia	15.3	**19**	**0.22**	**0.35**	**0.43**	**-0.15**	**0.13**	**0.11**
Belgium	14.4	**31**	**0.19**	**0.69**	**0.76**	**-0.09**	**0.33**	**0.51**
Chinese Taipei	13.7	**57**	**0.50**	**0.59**	**0.74**	**-0.17**	c	**0.34**
Netherlands	12.6	-10	0.06	**0.63**	**0.42**	**-0.08**	**0.25**	**0.26**
Korea	12.5	**24**	**0.55**	**0.42**	**0.63**	-0.11	c	0.05
Chile	12.4	-20	**0.22**	**0.50**	**0.59**	**-0.06**	-0.01	**0.32**
Slovak Republic	11.8	6	-0.10	**0.36**	**0.50**	**-0.22**	c	**0.51**
Brazil	11.6	**18**	**0.19**	**0.19**	**0.46**	**-0.12**	0.08	**0.18**
Switzerland	11.4	-15	**0.15**	**0.50**	**0.61**	-0.04	**0.31**	**0.44**
Croatia	11.2	**31**	0.08	**0.32**	**0.45**	**-0.16**	**0.11**	**0.17**
Japan	10.7	**53**	**0.33**	**0.40**	**0.33**	0.00	c	**0.94**
Italy	10.5	4	0.04	**0.38**	**0.40**	**-0.08**	**0.42**	**0.38**
Portugal	10.5	20	**0.36**	**0.66**	**0.74**	**-0.24**	0.15	**0.22**
Turkey	10.3	**37**	-0.01	**0.48**	**0.45**	**-0.37**	c	**0.25**
Thailand	10.2	**34**	**0.28**	**0.42**	**0.35**	**-0.26**	c	0.16
Serbia	10.1	**16**	-0.02	**0.26**	**0.43**	**-0.21**	**-0.14**	**0.14**
Uruguay	9.8	6	-0.05	**0.39**	**0.54**	**-0.18**	c	**0.30**
Bulgaria	9.2	16	**0.17**	**0.52**	**0.58**	**-0.34**	c	**0.22**
Singapore	8.7	**30**	**0.11**	**0.33**	**0.54**	**-0.20**	0.00	**0.58**
Luxembourg	8.4	3	**0.34**	**0.58**	**0.50**	-0.03	0.03	0.05
Czech Republic	7.9	4	0.04	**0.40**	**0.27**	**-0.12**	0.16	**0.30**
Spain	7.8	-4	0.07	**0.31**	**0.79**	**-0.21**	**0.44**	**0.48**
Romania	7.6	9	**0.22**	**0.50**	**0.59**	**-0.16**	c	**0.26**
Montenegro	7.6	**21**	0.14	**0.25**	**0.39**	**-0.15**	-0.04	**0.14**
Colombia	7.5	17	**0.27**	**0.18**	**0.39**	-0.03	c	**0.14**
Shanghai-China	7.4	11	**0.13**	0.09	**0.55**	**-0.15**	c	**0.85**
Peru	7.3	23	**0.43**	**0.51**	**0.47**	**-0.11**	c	**0.16**
United States	6.6	24	**0.31**	**0.36**	**0.60**	**-0.24**	-0.02	0.15
Australia	5.5	3	**0.37**	**0.62**	**0.34**	**-0.09**	**-0.22**	**0.19**

Notes: The *index of familiarity with mathematics* is based on students' responses to 13 items measuring students' self-reported familiarity with mathematics concepts (such as exponential function, divisor, quadratic function, etc.).
The *index of exposure to applied mathematics* measures student-reported experience with applied mathematics tasks at school, such as working out from a train timetable how long it would take to get from one place to another.
The *index of exposure to pure mathematics* measures student-reported experience with mathematics tasks at school requiring knowledge of algebra (linear and quadratic equations).
Statistically significant values are indicated in bold.
Countries/economies are ranked in descending order of the percentage of variation in familiarity with mathematics explained by students' and schools' socio-economic profile.
Source: OECD, PISA 2012 Database, Tables 2.2, 2.3, 2.4a and 2.10.
StatLink http://dx.doi.org/10.1787/888933377666

■ Table 0.3 [Part 2/2] ■
SNAPSHOT OF VARIATION IN OPPORTUNITIES TO LEARN MATHEMATICS, BY CHARACTERISTICS OF STUDENTS AND SCHOOLS

Countries/economies where the strength of the relationship between socio-economic status and familiarity with mathematics is **below** the OECD average

Countries/economies where the strength of the relationship between socio-economic status and familiarity with mathematics is not statistically different from the OECD average

Countries/economies where the strength of the relationship between socio-economic status and familiarity with mathematics is **above** the OECD average

	Percentage of variation in familiarity with mathematics explained by students' and schools' socio-economic profile	Difference between socio-economically advantaged and disadvantaged students				Familiarity with mathematics (index)		
		Time spent per week in regular school lessons in mathematics (minutes)	Exposure to applied mathematics (index)	Exposure to pure mathematics (index)	Familiarity with mathematics (index)	Difference (boys-girls)	Difference (non-immigrant - immigrant)	Difference (attended pre-primary education - not attended)
	%	Dif.	Dif.	Dif.	Dif.	Dif.	Dif.	Dif.
OECD average	8.5	**7**	**0.23**	**0.44**	**0.45**	**-0.15**	**0.17**	**0.29**
Lithuania	5.4	5	**0.20**	**0.28**	**0.23**	**-0.33**	0.11	**0.13**
Ireland	5.1	1	**0.28**	**0.44**	**0.35**	**-0.15**	0.03	0.05
United Kingdom	5.0	-8	**0.26**	**0.36**	**0.32**	**-0.15**	0.04	**0.33**
New Zealand	4.9	3	**0.56**	**0.72**	**0.33**	**-0.12**	**-0.10**	**0.21**
Russian Federation	4.8	**20**	**0.22**	**0.35**	**0.36**	**-0.20**	**0.19**	**0.21**
Poland	4.7	9	**0.24**	**0.30**	**0.41**	**-0.21**	c	**0.21**
Argentina	4.7	**65**	**0.24**	**0.35**	**0.31**	**-0.17**	**0.28**	**0.26**
Indonesia	4.4	27	**0.33**	**0.27**	**0.18**	**-0.04**	c	**0.14**
Costa Rica	4.2	**22**	**0.19**	**0.42**	**0.32**	**-0.09**	**0.23**	**0.16**
United Arab Emirates	4.1	-5	**0.42**	**0.55**	**0.28**	**-0.35**	**-0.42**	**0.33**
Qatar	3.9	-5	**0.24**	**0.48**	**0.32**	0.02	**-0.48**	**0.32**
Greece	3.7	10	-0.04	**0.48**	**0.41**	**-0.32**	**0.36**	**0.34**
Iceland	3.5	3	**0.53**	**0.40**	**0.33**	**-0.32**	**0.46**	**0.38**
Latvia	3.3	**13**	**0.20**	**0.43**	**0.31**	**-0.36**	**0.29**	-0.06
Kazakhstan	3.2	**37**	**0.18**	**0.25**	**0.22**	**-0.10**	**0.11**	**0.18**
Macao-China	2.8	8	**0.14**	0.05	**-0.27**	0.00	**-0.24**	**0.46**
Israel	2.7	18	0.13	**0.44**	**0.32**	**-0.16**	0.07	**0.66**
Sweden	2.7	-6	**0.45**	**0.40**	**0.26**	**-0.17**	**0.16**	**0.23**
Canada	2.6	11	**0.41**	**0.43**	**0.29**	**-0.18**	-0.04	0.07
Viet Nam	2.6	**21**	-0.02	**0.40**	**0.24**	**-0.19**	c	**0.22**
Tunisia	2.2	21	**0.30**	**0.50**	**0.12**	**-0.12**	c	**0.12**
Mexico	1.9	11	**0.15**	**0.23**	**0.18**	**-0.10**	**0.22**	**0.14**
Jordan	1.6	3	**0.55**	**0.54**	**0.33**	**-0.53**	-0.04	**0.25**
Finland	1.4	5	**0.36**	**0.40**	**0.23**	**-0.24**	**0.29**	0.10
Denmark	1.2	-1	**0.16**	**0.16**	**0.20**	-0.03	**0.21**	**0.42**
Hong Kong-China	1.2	8	**0.23**	**0.23**	**-0.24**	0.05	**-0.11**	**0.33**
Malaysia	0.6	**33**	**0.50**	**0.59**	**0.11**	**-0.07**	0.02	0.03
Estonia	0.6	4	**0.29**	**0.29**	**0.13**	**-0.21**	**0.23**	**-0.15**
Cyprus[1]	0.2	6	**0.41**	**0.54**	0.11	**-0.43**	**0.32**	**0.24**
Albania	m	m	m	m	m	-0.01	c	**0.14**
France	w	**18**	**0.32**	**0.54**	**0.64**	**-0.16**	**0.21**	**0.62**
Norway	m	2	**0.27**	**0.28**	m	m	m	m

1. See note 1 under Snapshot Table 0.1 [Part 2/2].

Notes: The *index of familiarity with mathematics* is based on students' responses to 13 items measuring students' self-reported familiarity with mathematics concepts (such as exponential function, divisor, quadratic function, etc.).

The *index of exposure to applied mathematics* measures student-reported experience with applied mathematics tasks at school, such as working out from a train timetable how long it would take to get from one place to another.

The *index of exposure to pure mathematics* measures student-reported experience with mathematics tasks at school requiring knowledge of algebra (linear and quadratic equations).

Statistically significant values are indicated in bold.

Countries/economies are ranked in descending order of the percentage of variation in familiarity with mathematics explained by students' and schools' socio-economic profile.

Source: OECD, PISA 2012 Database, Tables 2.2, 2.3, 2.4a and 2.10.

StatLink http://dx.doi.org/10.1787/888933377666

■ Table 0.4 [Part 1/2] ■
SNAPSHOT OF VARIATION IN FAMILIARITY WITH MATHEMATICS, BY STUDENTS' SOCIO-ECONOMIC STATUS

Countries/economies where familiarity with mathematics is **above** the OECD average
Countries/economies where familiarity with mathematics is not statistically different from the OECD average
Countries/economies where familiarity with mathematics is **below** the OECD average

	Percentage of students who know well/understand the concept								
	Arithmetic mean			Linear equation			Vectors		
	Socio-economically disadvantaged students	Socio-economically advantaged students	Difference (advantaged - disadvantaged)	Socio-economically disadvantaged students	Socio-economically advantaged students	Difference (advantaged - disadvantaged)	Socio-economically disadvantaged students	Socio-economically advantaged students	Difference (advantaged - disadvantaged)
	%	%	% dif.	%	%	% dif.	%	%	% dif.
OECD average	20.4	39.9	**19.5**	29.9	54.3	**24.5**	12.1	29.8	**17.7**
Bulgaria	31.7	72.5	**40.8**	35.8	75.3	**39.5**	19.7	60.7	**41.0**
Romania	36.9	74.7	**37.8**	37.8	72.6	**34.7**	28.5	54.3	**25.8**
Slovak Republic	28.9	63.0	**34.1**	41.7	72.0	**30.4**	5.3	21.6	**16.3**
Poland	48.8	82.1	**33.4**	10.0	22.0	**12.0**	12.1	33.4	**21.3**
Chinese Taipei	31.4	62.5	**31.1**	10.9	41.1	**30.1**	11.4	28.5	**17.1**
Croatia	35.3	66.1	**30.8**	61.6	83.1	**21.5**	45.3	67.7	**22.5**
Greece	30.5	60.3	**29.8**	16.6	33.2	**16.6**	31.6	63.4	**31.8**
Cyprus[1]	24.6	54.2	**29.7**	10.3	41.6	**31.2**	25.8	60.2	**34.4**
Serbia	24.0	53.6	**29.6**	53.4	77.2	**23.8**	47.2	70.7	**23.5**
Estonia	46.4	75.0	**28.6**	54.6	73.6	**19.0**	4.2	9.1	**4.9**
Russian Federation	57.3	85.9	**28.6**	55.8	84.2	**28.4**	51.6	78.8	**27.3**
Israel	29.8	58.4	**28.5**	41.1	67.2	**26.1**	6.0	16.6	**10.6**
Portugal	8.7	37.0	**28.4**	16.9	34.7	**17.8**	28.3	65.8	**37.4**
Czech Republic	39.4	66.9	**27.5**	46.5	70.8	**24.3**	4.7	21.7	**17.1**
Turkey	38.1	65.6	**27.5**	22.1	34.7	**12.6**	31.4	56.7	**25.3**
Spain	21.7	49.1	**27.5**	27.5	56.2	**28.7**	15.8	42.3	**26.5**
Kazakhstan	38.7	66.0	**27.3**	34.8	60.3	**25.6**	41.7	66.7	**25.0**
Shanghai-China	54.3	81.3	**27.0**	5.3	12.8	**7.5**	57.7	87.1	**29.4**
Slovenia	26.3	53.2	**26.9**	50.0	76.9	**27.0**	11.2	47.4	**36.2**
Denmark	29.1	55.9	**26.8**	26.6	52.8	**26.2**	1.7	6.6	**4.8**
Tunisia	34.5	59.4	**24.9**	9.1	17.7	**8.7**	16.6	23.2	**6.6**
Latvia	49.1	73.8	**24.8**	38.9	59.7	**20.8**	3.7	13.1	**9.5**
Lithuania	25.0	48.3	**23.3**	25.4	46.4	**20.9**	0.8	5.4	**4.6**
Singapore	14.9	37.9	**23.0**	45.3	78.4	**33.1**	27.6	57.7	**30.1**
Korea	3.9	26.5	**22.6**	51.0	84.5	**33.4**	0.7	5.6	**4.9**
Italy	45.2	67.4	**22.2**	25.0	49.6	**24.6**	25.9	47.3	**21.4**
Hungary	9.3	31.4	**22.1**	32.7	72.7	**40.0**	29.9	60.6	**30.7**
United States	9.8	31.6	**21.7**	42.6	71.4	**28.7**	7.5	17.7	**10.3**
Peru	15.0	36.6	**21.6**	23.6	50.5	**26.9**	9.6	30.0	**20.4**
Viet Nam	15.9	37.5	**21.6**	2.6	6.1	**3.5**	45.6	73.1	**27.5**
Brazil	10.3	30.6	**20.3**	7.7	21.0	**13.3**	5.7	23.2	**17.5**
Austria	5.5	25.5	**20.0**	30.1	71.2	**41.1**	15.2	49.7	**34.5**

1. See note 1 under Snapshot Table 0.1 [Part 2/2].
Note: Statistically significant values are indicated in bold.
Countries/economies are ranked in descending order of the difference in the percentage of students who know well/understand the concept of arithmetic mean between socio-economically advantaged and disadvantaged students.
Source: OECD, PISA 2012 Database, Table 2.4b.
StatLink http://dx.doi.org/10.1787/888933377670

■ Table 0.4 [Part 2/2] ■
SNAPSHOT OF VARIATION IN FAMILIARITY WITH MATHEMATICS, BY STUDENTS' SOCIO-ECONOMIC STATUS

Countries/economies where familiarity with mathematics is **above** the OECD average
Countries/economies where familiarity with mathematics is not statistically different from the OECD average
Countries/economies where familiarity with mathematics is **below** the OECD average

	Percentage of students who know well/understand the concept								
	Arithmetic mean			Linear equation			Vectors		
	Socio-economically disadvantaged students	Socio-economically advantaged students	Difference (advantaged - disadvantaged)	Socio-economically disadvantaged students	Socio-economically advantaged students	Difference (advantaged - disadvantaged)	Socio-economically disadvantaged students	Socio-economically advantaged students	Difference (advantaged - disadvantaged)
	%	%	% dif.	%	%	% dif.	%	%	% dif.
OECD average	20.4	39.9	**19.5**	29.9	54.3	**24.5**	12.1	29.8	**17.7**
Indonesia	20.4	40.2	**19.9**	14.9	26.9	**11.9**	8.2	15.4	**7.2**
Thailand	23.6	43.2	**19.7**	27.8	47.0	**19.2**	13.4	37.7	**24.3**
Ireland	12.3	31.9	**19.6**	25.7	51.4	**25.7**	3.3	5.1	**1.8**
Belgium	19.7	39.1	**19.3**	16.2	27.3	**11.1**	24.9	47.9	**23.0**
Japan	66.6	84.3	**17.8**	57.1	77.7	**20.6**	4.3	14.8	**10.5**
Iceland	26.3	42.7	**16.3**	5.3	13.9	**8.6**	2.0	5.4	**3.4**
United Kingdom	11.2	27.6	**16.3**	24.2	51.1	**26.9**	17.2	38.4	**21.2**
Jordan	57.6	72.6	**15.0**	48.5	68.7	**20.2**	14.2	23.7	**9.6**
Liechtenstein	4.0	18.8	**14.8**	34.6	62.6	**28.0**	18.2	36.3	**18.0**
Australia	8.4	23.1	**14.6**	30.1	63.9	**33.8**	8.7	18.1	**9.3**
New Zealand	3.5	17.9	**14.5**	20.5	54.3	**33.8**	5.8	22.6	**16.7**
Netherlands	19.3	32.9	**13.7**	29.8	59.1	**29.3**	5.4	12.5	**7.2**
Chile	12.1	25.3	**13.2**	31.3	70.4	**39.1**	15.0	46.9	**32.0**
France	17.0	30.1	**13.2**	36.3	54.8	**18.5**	27.3	72.1	**44.7**
Colombia	13.7	26.1	**12.4**	19.5	41.8	**22.3**	16.9	38.9	**22.0**
Luxembourg	6.0	17.8	**11.8**	16.7	37.4	**20.7**	12.6	45.3	**32.7**
Switzerland	6.4	17.7	**11.2**	19.3	46.7	**27.5**	11.8	26.1	**14.3**
Montenegro	17.0	28.1	**11.1**	47.0	69.4	**22.3**	33.8	55.2	**21.4**
Costa Rica	7.7	18.1	**10.4**	12.5	38.4	**25.9**	15.1	36.7	**21.6**
Canada	9.8	19.8	**10.0**	41.1	69.5	**28.5**	8.4	17.9	**9.5**
Mexico	14.4	23.9	**9.5**	21.2	42.6	**21.4**	5.6	17.4	**11.8**
Germany	13.5	22.2	**8.8**	48.0	72.9	**24.8**	11.6	17.4	**5.9**
Hong Kong-China	40.8	49.0	**8.2**	18.3	40.8	**22.5**	8.0	21.3	**13.4**
Macao-China	32.1	39.5	**7.4**	71.7	72.0	0.3	14.1	28.6	**14.5**
Qatar	29.0	35.8	**6.7**	30.0	49.1	**19.2**	15.6	30.4	**14.7**
Finland	1.8	6.4	**4.6**	22.3	45.0	**22.7**	1.3	4.3	**3.1**
Uruguay	3.9	8.2	**4.3**	16.3	38.5	**22.2**	20.8	51.4	**30.6**
United Arab Emirates	48.5	51.9	3.4	42.3	62.2	**19.9**	16.0	36.4	**20.4**
Argentina	5.8	8.9	**3.0**	17.3	32.4	**15.1**	11.2	27.0	**15.8**
Sweden	2.8	5.5	**2.8**	5.6	12.0	**6.4**	2.2	4.8	**2.6**
Malaysia	3.8	4.5	0.7	21.8	54.1	**32.4**	6.2	17.2	**11.0**
Norway	m	m	m	m	m	m	m	m	m

Note: Statistically significant values are indicated in bold.
Countries/economies are ranked in descending order of the difference in the percentage of students who know well/understand the concept of arithmetic mean between socio-economically advantaged and disadvantaged students.
Source: OECD, PISA 2012 Database, Table 2.4b.
StatLink http://dx.doi.org/10.1787/888933377670

■ Table 0.5 [Part 1/2] ■
SNAPSHOT OF THE RELATIONSHIP BETWEEN OPPORTUNITY TO LEARN AND HORIZONTAL STRATIFICATION

	Age at first tracking	Percentage of students in vocational schools			Percentage of students in schools with ability grouping for some or all classes		
		All students	Socio-economically disadvantaged students	Students who are less familiar with mathematics	All students	Students in socio-economically disadvantaged schools	Students in schools with overall less familiarity with mathematics
	Years	%	%	%	%	%	%
OECD average	15	14.5	19.8	21.3	74.1	78.2	79.1
Serbia	m	74.4	87.9	86.9	94.8	98.3	97.9
Croatia	14	70.1	89.7	90.4	92.0	99.1	100.0
Austria	10	69.3	79.2	89.5	28.1	62.9	57.9
Montenegro	15	66.0	81.5	76.6	93.1	95.6	92.9
Slovenia	14	53.2	74.9	74.7	49.5	50.6	38.9
Italy	14	49.6	68.1	65.6	75.9	80.8	80.1
Belgium	12	44.0	64.0	69.6	79.4	87.9	78.3
Bulgaria	13	40.8	55.2	48.6	93.1	91.9	92.9
Turkey	11	38.1	43.5	55.1	75.8	74.1	88.4
Chinese Taipei	15	34.5	49.9	41.7	80.5	83.6	75.9
Czech Republic	11	31.0	33.7	33.7	41.2	44.6	35.2
Colombia	15	25.2	19.3	17.6	93.6	89.4	94.4
Mexico	15	25.2	19.3	21.5	73.7	78.4	82.7
Japan	15	24.2	36.3	30.6	63.1	64.5	73.7
Netherlands	12	22.2	38.5	37.7	93.6	94.5	95.0
Shanghai-China	15	21.2	29.5	36.4	94.1	94.2	87.3
Indonesia	15	20.2	18.6	17.1	75.4	75.1	86.4
Korea	14	19.9	37.7	34.2	90.1	83.7	77.2
Thailand	15	19.6	21.4	26.0	76.3	69.7	77.7
Portugal	15	16.7	27.9	29.4	61.7	80.4	74.3
France	15	15.3	23.2	27.4	56.2	68.7	74.4
Luxembourg	13	14.5	16.0	14.3	67.9	80.6	86.0
Argentina	15	14.5	16.7	16.0	85.5	87.3	84.1
Hungary	11	14.3	30.4	31.7	76.7	72.6	73.9
Greece	15	13.5	22.5	24.8	18.6	32.0	34.1
Malaysia	15	13.3	13.4	13.8	95.9	97.7	100.0
Australia	16	10.9	14.1	14.1	98.4	99.5	99.4
Cyprus[1]	15	10.8	20.3	19.7	50.9	60.8	66.7
Switzerland	12	10.7	10.6	13.4	85.0	92.4	98.8
Costa Rica	m	9.1	8.1	5.7	60.4	50.9	47.6
Albania	15	8.4	m	8.3	99.9	m	100.0
Slovak Republic	11	8.2	13.2	14.6	71.6	70.4	77.7
Kazakhstan	m	7.7	8.1	7.6	97.6	100.0	100.0
Russian Federation	15.5	4.1	6.2	4.8	96.0	92.7	100.0

1. See note 1 under Snapshot Table 0.1 [Part 2/2].
Countries/economies are ranked in descending order of the percentage of students in vocational programmes.
Source: OECD, PISA 2012 Database, Tables 2.16, 2.17 and 2.19a.
StatLink http://dx.doi.org/10.1787/888933377680

■ Table 0.5 [Part 2/2] ■
SNAPSHOT OF THE RELATIONSHIP BETWEEN OPPORTUNITY TO LEARN AND HORIZONTAL STRATIFICATION

	Age at first tracking	Percentage of students in vocational schools			Percentage of students in schools with ability grouping for some or all classes		
		All students	Socio-economically disadvantaged students	Students who are less familiar with mathematics	All students	Students in socio-economically disadvantaged schools	Students in schools with overall less familiarity with mathematics
	Years	%	%	%	%	%	%
OECD average	15	14.5	19.8	21.3	74.1	78.2	79.1
Israel	15	3.1	5.2	7.1	98.3	98.5	100.0
Chile	16	2.8	4.3	3.7	64.3	77.1	77.8
United Arab Emirates	15	2.7	1.6	4.4	86.2	91.9	81.7
Germany	10	2.0	3.3	4.9	68.1	82.5	84.2
Macao-China	15	1.6	3.0	1.8	66.1	56.8	77.1
Uruguay	11	1.4	2.0	1.9	91.1	93.3	97.0
United Kingdom	16	1.1	1.5	1.4	99.3	99.5	99.6
Latvia	16	0.9	1.2	0.7	82.2	88.4	88.2
Ireland	15	0.8	2.1	1.3	99.2	100.0	100.0
Spain	16	0.7	1.6	1.5	92.4	96.0	94.0
Lithuania	16	0.6	1.3	1.3	84.1	83.8	96.2
Estonia	15	0.4	1.0	0.0	89.1	82.1	91.5
Sweden	16	0.4	0.1	0.4	84.3	79.0	87.5
Poland	16	0.1	0.0	0.0	57.6	51.6	30.2
Brazil	15	0.0	0.0	0.0	81.6	80.2	83.2
New Zealand	16	0.0	0.0	0.0	98.7	99.4	100.0
Finland	16	0.0	0.0	0.0	64.5	51.6	60.2
Canada	16	0.0	0.0	0.0	92.9	94.6	94.9
Norway	16	0.0	0.0	m	45.8	59.5	m
Romania	14	0.0	0.0	0.0	90.3	86.7	91.7
Iceland	16	0.0	0.0	0.0	87.1	98.2	100.0
Qatar	15	0.0	0.0	0.0	91.6	92.8	93.5
Denmark	16	0.0	0.0	0.0	75.9	77.2	85.9
Liechtenstein	15	0.0	0.0	0.0	59.9	c	100.0
Jordan	16	0.0	0.0	0.0	81.7	85.3	92.2
Viet Nam	15	0.0	0.0	0.0	93.1	87.9	88.3
United States	16	0.0	0.0	0.0	93.9	94.9	79.9
Singapore	12	0.0	0.0	0.0	97.2	97.9	100.0
Tunisia	m	0.0	0.0	0.0	82.3	80.2	100.0
Hong Kong-China	15	0.0	0.0	0.0	91.0	97.7	100.0
Peru	16	0.0	0.0	0.0	86.8	84.4	83.8

Countries/economies are ranked in descending order of the percentage of students in vocational programmes.
Source: OECD, PISA 2012 Database, Tables 2.16, 2.17 and 2.19a.
StatLink http://dx.doi.org/10.1787/888933377680

■ Table 0.6 [Part 1/2] ■
SNAPSHOT OF THE RELATIONSHIP BETWEEN OPPORTUNITY TO LEARN AND MATHEMATICS PERFORMANCE

Countries/economies where performance in the mathematics subscale is **above** the OECD average
Countries/economies where performance in the mathematics subscale is not statistically different from the OECD average
Countries/economies where performance in the mathematics subscale is **below** the OECD average

	Performance in mathematics, by content area				Score-point difference in mathematics performance associated with a one-unit increase in the index of:			Percentage of the difference in mathematics performance between socio-economically disadvantaged and advantaged students associated with different levels of familiarity with mathematics
	Change and relationships	Quantity	Space and shape	Uncertainty and data	Exposure to applied mathematics	Exposure to pure mathematics	Familiarity with mathematics	
	Mean score	Mean score	Mean score	Mean score	Score-point change	Score-point change	Score-point change	%
OECD average	493	495	490	493	**9**	**30**	**41**	18.8
Korea	559	537	573	538	**28**	**61**	**55**	33.7
New Zealand	501	499	491	506	**26**	**42**	**55**	14.4
Australia	509	500	497	508	**21**	**37**	**55**	20.7
Chinese Taipei	561	543	592	549	**27**	**47**	**51**	22.2
Switzerland	530	531	544	522	**10**	**36**	**50**	29.5
Liechtenstein	542	538	539	526	15	**33**	**49**	33.9
Hungary	481	476	474	476	2	**28**	**48**	29.0
Singapore	580	569	580	559	**8**	**44**	**48**	19.1
Germany	516	517	507	509	3	**35**	**48**	29.9
Slovenia	499	504	503	496	4	**28**	**48**	19.2
France	497	496	489	492	**20**	**33**	**47**	22.3
Italy	477	491	487	482	1	**31**	**47**	21.6
Portugal	486	481	491	486	**8**	**29**	**47**	26.3
Netherlands	518	532	507	532	2	**44**	**46**	22.5
Croatia	468	480	460	468	**10**	**26**	**45**	23.3
United States	488	478	463	488	**13**	**31**	**44**	27.4
Slovak Republic	474	486	490	472	**-10**	**30**	**43**	13.6
United Kingdom	496	494	475	502	**20**	**32**	**43**	15.3
Sweden	469	482	469	483	**10**	**20**	**43**	14.9
Belgium	513	519	509	508	**12**	**38**	**42**	28.2
Austria	506	510	501	499	**8**	**31**	**41**	31.3
Brazil	368	389	378	400	**4**	**9**	**40**	26.5
Peru	349	365	370	373	**5**	**33**	**40**	19.3
Poland	509	519	524	517	**12**	**26**	**40**	14.9
Canada	525	515	510	516	**15**	**28**	**40**	16.4
Luxembourg	488	495	486	483	**10**	**27**	**40**	17.6
Ireland	501	505	478	509	**16**	**28**	**40**	12.2
Qatar	363	371	380	382	2	**38**	**40**	19.3
Chile	411	421	419	430	**10**	**24**	**39**	22.7
Czech Republic	499	505	499	488	-4	**26**	**39**	13.6
Thailand	414	419	432	433	**12**	**30**	**39**	25.9
Serbia	442	456	446	448	-3	**17**	**38**	18.7
Uruguay	401	411	413	407	**-8**	**20**	**38**	15.5

Notes: The *index of exposure to applied mathematics* measures student-reported experience with applied mathematics tasks at school, such as working out from a train timetable how long it would take to get from one place to another.
The *index of exposure to pure mathematics* measures student-reported experience with mathematics tasks at school requiring knowledge of algebra (linear and quadratic equations).
The *index of familiarity with mathematics* is based on students' responses to 13 items measuring students' self-reported familiarity with mathematics concepts (such as exponential function, divisor, quadratic function, etc.).
Macao-China and Hong-Kong China are the only two economies where disadvantaged students report a higher familiarity with mathematics than advantaged students. In these two economies, eliminating the difference in familiarity between advantaged and disadvantaged students would increase the performance gap of disadvantaged students. This explains why the graph reports negative percentages for these two economies.
Statistically significant values are indicated in bold.
Countries/economies are ranked in descending order of the score-point difference in mathematics performance associated with a one-unit increase in familiarity with mathematics.
Source: OECD, PISA 2012 Database, Tables 3.2a, 3.7 and 3.16.
StatLink http://dx.doi.org/10.1787/888933377691

■ Table 0.6 [Part 2/2] ■

SNAPSHOT OF THE RELATIONSHIP BETWEEN OPPORTUNITY TO LEARN AND MATHEMATICS PERFORMANCE

Countries/economies where performance in the mathematics subscale is **above** the OECD average
Countries/economies where performance in the mathematics subscale is not statistically different from the OECD average
Countries/economies where performance in the mathematics subscale is **below** the OECD average

	Performance in mathematics, by content area				Score-point difference in mathematics performance associated with a one-unit increase in the index of:			Percentage of the difference in mathematics performance between socio-economically disadvantaged and advantaged students associated with different levels of familiarity with mathematics
	Change and relationships	Quantity	Space and shape	Uncertainty and data	Exposure to applied mathematics	Exposure to pure mathematics	Familiarity with mathematics	
	Mean score	Mean score	Mean score	Mean score	Score-point change	Score-point change	Score-point change	%
OECD average	493	495	490	493	**9**	**30**	**41**	18.8
Turkey	448	442	443	447	**-4**	**29**	**38**	19.6
Lithuania	479	483	472	474	**8**	**33**	**36**	9.7
Japan	542	518	558	528	**24**	**34**	**36**	13.2
Indonesia	364	362	383	384	**6**	**13**	**36**	14.9
United Arab Emirates	442	431	425	432	**10**	**36**	**36**	12.9
Bulgaria	434	443	442	432	-3	**28**	**35**	13.7
Shanghai-China	624	591	649	592	**-5**	2	**35**	11.0
Iceland	487	496	489	496	**12**	**31**	**34**	18.6
Spain	482	491	477	487	**-4**	**24**	**34**	23.1
Finland	520	527	507	519	**24**	**31**	**34**	11.3
Colombia	357	375	369	388	**7**	**15**	**34**	19.8
Israel	462	480	449	465	-4	**29**	**32**	7.4
Russian Federation	491	478	496	463	**4**	**29**	**32**	14.4
Montenegro	399	409	412	415	**5**	**24**	**30**	15.8
Greece	446	455	436	460	**-10**	**25**	**29**	9.4
Viet Nam	509	509	507	519	-2	**25**	**29**	7.9
Latvia	496	487	497	478	**7**	**29**	**28**	8.7
Estonia	530	525	513	510	**7**	**16**	**28**	5.1
Malaysia	401	409	434	422	**16**	**40**	**27**	3.6
Denmark	494	502	497	505	2	**7**	**26**	7.1
Mexico	405	414	413	413	**5**	**21**	**26**	7.0
Jordan	387	367	385	394	**8**	**28**	**24**	15.8
Cyprus[1]	440	439	436	442	**8**	**32**	**24**	2.1
Macao-China	542	531	558	525	-3	**17**	**23**	-21.0
Costa Rica	402	406	397	414	-3	**16**	**23**	7.6
Romania	446	443	447	437	**4**	**21**	**23**	11.1
Argentina	379	391	385	389	2	**17**	**21**	8.2
Kazakhstan	433	428	450	414	-2	**19**	**20**	7.9
Hong Kong-China	564	566	567	553	5	**38**	**18**	-6.0
Tunisia	379	378	382	399	1	**26**	**16**	3.1
Albania	388	386	418	386	-1	-3	-2	m
Norway	478	492	480	497	**15**	**30**	m	m

1. See note 1 under Snapshot Table 0.1 [Part 2/2].

Notes: The *index of exposure to applied mathematics* measures student-reported experience with applied mathematics tasks at school, such as working out from a train timetable how long it would take to get from one place to another.
The *index of exposure to pure mathematics* measures student-reported experience with mathematics tasks at school requiring knowledge of algebra (linear and quadratic equations).
The *index of familiarity with mathematics* is based on students' responses to 13 items measuring students' self-reported familiarity with mathematics concepts (such as exponential function, divisor, quadratic function, etc.).
Macao-China and Hong-Kong China are the only two economies where disadvantaged students report a higher familiarity with mathematics than advantaged students. In these two economies, eliminating the difference in familiarity between advantaged and disadvantaged students would increase the performance gap of disadvantaged students. This explains why the graph reports negative percentages for these two economies.
Statistically significant values are indicated in bold.
Countries/economies are ranked in descending order of the score-point difference in mathematics performance associated with a one-unit increase in familiarity with mathematics.
Source: OECD, PISA 2012 Database, Tables 3.2a, 3.7 and 3.16.
StatLink http://dx.doi.org/10.1787/888933377691

■ Table 0.7 [Part 1/2] ■
SNAPSHOT OF THE RELATIONSHIP BETWEEN OPPORTUNITY TO LEARN AND STUDENTS' ATTITUDES TOWARDS MATHEMATICS

Countries/economies where the percentage of students with positive attitudes towards mathematics is **above** the OECD average

Countries/economies where the percentage of students with positive attitudes towards mathematics is not statistically different from the OECD average

Countries/economies where the percentage of students with positive attitudes towards mathematics is **below** the OECD average

	Percentage of students who agreed or strongly agreed with the statement "I do mathematics because I enjoy it"	Percentage of students who disagreed or strongly disagreed with the statement "I am just not good at mathematics"	Percentage of students who agreed or strongly agreed with the statement "I often worry that it will be difficult for me in mathematics classes"	Change in the index of mathematics self-concept/anxiety associated with a one-unit increase in the index of familiarity with mathematics			
				Mathematics self-concept		Mathematics anxiety	
				Before accounting for performance in mathematics	After accounting for performance in mathematics	Before accounting for performance in mathematics	After accounting for performance in mathematics
	%	%	%	Index change	Index change	Index change	Index change
OECD average	38.1	57.3	59.5	**0.10**	**-0.10**	**-0.12**	**0.07**
Albania	70.3	39.4	66.8	**0.11**	**0.11**	**-0.26**	**-0.26**
Korea	30.7	42.6	76.9	**0.29**	0.04	**-0.14**	-0.04
Serbia	26.8	52.1	62.6	**0.19**	0.03	**-0.24**	**-0.09**
Jordan	64.9	48.9	77.5	**0.13**	0.03	**-0.09**	**-0.05**
Singapore	72.2	62.3	60.7	**0.17**	0.03	**-0.22**	**-0.06**
Chinese Taipei	40.3	39.9	71.5	**0.25**	0.02	**-0.12**	0.03
Turkey	52.7	47.6	66.7	**0.12**	0.01	**-0.18**	-0.04
United Arab Emirates	63.9	62.7	68.1	**0.11**	0.01	**-0.21**	**-0.05**
Viet Nam	67.4	75.5	72.1	**0.07**	0.00	**-0.08**	-0.01
Hong Kong-China	54.9	50.1	68.9	**0.06**	0.00	**-0.10**	**-0.05**
Peru	62.7	51.2	72.9	**0.09**	0.00	**-0.12**	-0.03
Israel	39.8	73.5	66.6	**0.08**	0.00	**-0.07**	0.02
Malaysia	73.4	48.3	76.6	0.05	-0.01	**-0.08**	-0.01
Romania	57.8	48.9	76.8	0.03	-0.02	**-0.14**	**-0.07**
Russian Federation	42.9	57.7	57.8	**0.09**	-0.02	**-0.11**	0.01
Colombia	51.3	56.5	64.4	**0.09**	-0.03	**-0.14**	-0.01
Montenegro	34.0	51.8	65.0	**0.10**	-0.03	**-0.13**	0.01
Spain	37.0	50.5	68.0	**0.14**	**-0.03**	**-0.08**	0.04
Italy	45.8	52.8	73.2	**0.16**	**-0.03**	**-0.10**	**0.06**
Mexico	52.8	47.0	77.5	**0.07**	**-0.04**	**-0.07**	0.03
Iceland	47.7	63.8	45.2	**0.18**	-0.04	**-0.24**	-0.04
Cyprus[1]	47.1	59.1	68.0	**0.08**	-0.04	**-0.11**	0.01
Shanghai-China	49.3	53.1	53.4	**0.06**	**-0.04**	**-0.11**	0.00
Bulgaria	39.2	43.7	70.2	**0.04**	**-0.04**	**-0.15**	0.01
Tunisia	58.0	45.2	79.4	0.02	-0.05	0.01	0.05
Costa Rica	47.5	55.8	72.4	**0.07**	-0.05	-0.05	0.05
Macao-China	42.3	51.6	70.4	0.04	**-0.05**	**-0.08**	0.01
Portugal	45.5	51.5	69.7	**0.17**	-0.05	**-0.11**	0.04
Brazil	56.4	44.0	71.4	**0.05**	**-0.06**	**-0.14**	0.01
Greece	51.7	56.5	72.7	**0.07**	**-0.06**	**-0.10**	0.03
Thailand	70.6	24.2	73.0	-0.03	**-0.07**	-0.04	0.01
Kazakhstan	72.6	63.0	55.2	-0.02	**-0.07**	-0.05	0.01

1. See note 1 under Snapshot Table 0.1 [Part 2/2].

Notes: The *index of familiarity with mathematics* is based on students' responses to 13 items measuring students' self-reported familiarity with mathematics concepts (such as exponential functions, divisor, quadratic function, etc.).

The *index of mathematics self-concept* is based on the degree to which students agreed with the statements: "I'm just not good in mathematics"; "I get good grades in mathematics"; "I learn mathematics quickly"; "I have always believed that mathematics is one of my best subjects"; and "In my mathematics class, I understand even the most difficult work".

The *index of mathematics anxiety* is based on the degree to which students agreed with the statements: "I often worry that it will be difficult for me in mathematics classes"; "I get very tense when I have to do mathematics homework"; "I get very nervous doing mathematics problems"; "I feel helpless when doing a mathematics problem"; and "I worry that I will get poor marks in mathematics".

The OECD average of the percentage of students who agreed or strongly agreed with the statement "I do mathematics because I enjoy it" is based on all OECD countries. The corresponding OECD average reported in Table 4.1 is based on the OECD countries that participated in both PISA 2003 and PISA 2012.

Statistically significant values are indicated in bold.

Countries/economies are ranked in descending order of the change in mathematics self-concept associated with a one-unit increase in familiarity with mathematics after accounting for performance in mathematics.

Source: OECD, PISA 2012 Database, Tables 4.1, 4.2, 4.3, 4.6 and 4.9.

StatLink http://dx.doi.org/10.1787/888933377700

■ Table 0.7 [Part 2/2] ■
SNAPSHOT OF THE RELATIONSHIP BETWEEN OPPORTUNITY TO LEARN AND STUDENTS' ATTITUDES TOWARDS MATHEMATICS

Countries/economies where the percentage of students with positive attitudes towards mathematics is **above** the OECD average

Countries/economies where the percentage of students with positive attitudes towards mathematics is not statistically different from the OECD average

Countries/economies where the percentage of students with positive attitudes towards mathematics is **below** the OECD average

	Percentage of students who agreed or strongly agreed with the statement "I do mathematics because I enjoy it"	Percentage of students who disagreed or strongly disagreed with the statement "I am just not good at mathematics"	Percentage of students who agreed or strongly agreed with the statement "I often worry that it will be difficult for me in mathematics classes"	Change in the index of mathematics self-concept/anxiety associated with a one-unit increase in the index of familiarity with mathematics			
				Mathematics self-concept		Mathematics anxiety	
				Before accounting for performance in mathematics	After accounting for performance in mathematics	Before accounting for performance in mathematics	After accounting for performance in mathematics
	%	%	%	Index change	Index change	Index change	Index change
OECD average	38.1	57.3	59.5	**0.10**	**-0.10**	**-0.12**	**0.07**
Hungary	27.5	53.7	62.0	**0.12**	**-0.08**	**-0.20**	0.03
Slovenia	27.1	54.7	61.3	**0.14**	**-0.08**	**-0.13**	0.03
Qatar	60.6	53.2	68.6	0.02	**-0.08**	**-0.15**	0.00
Latvia	38.6	59.1	57.1	**0.06**	**-0.08**	**-0.13**	-0.02
Indonesia	78.3	39.0	76.7	**-0.08**	**-0.08**	-0.05	0.01
Japan	30.8	45.9	70.4	0.02	**-0.09**	-0.02	**0.07**
Ireland	37.0	60.1	69.8	**0.11**	**-0.09**	**-0.14**	0.06
Australia	39.0	63.4	59.7	**0.19**	**-0.11**	**-0.18**	**0.08**
Canada	36.6	63.4	59.6	**0.15**	**-0.11**	**-0.17**	**0.06**
Croatia	20.9	55.1	66.4	**0.12**	**-0.11**	**-0.14**	**0.09**
United States	36.6	66.7	57.3	**0.12**	**-0.11**	**-0.16**	**0.08**
Poland	36.1	46.3	57.4	**0.19**	**-0.11**	**-0.22**	0.08
Finland	28.8	58.6	51.7	**0.14**	**-0.12**	**-0.11**	**0.07**
Chile	42.3	40.1	72.3	**0.10**	**-0.12**	**-0.09**	0.04
Estonia	38.1	50.5	53.8	**0.07**	**-0.12**	**-0.18**	0.01
France	41.5	57.7	64.5	**0.14**	**-0.12**	**-0.06**	**0.12**
Netherlands	32.4	62.6	36.9	0.01	**-0.12**	-0.05	0.08
Belgium	28.8	61.3	58.2	**0.04**	**-0.12**	-0.02	**0.14**
New Zealand	38.2	59.0	62.1	**0.11**	**-0.12**	**-0.16**	**0.09**
United Kingdom	40.8	67.5	47.3	**0.12**	**-0.13**	**-0.14**	**0.09**
Denmark	56.9	71.0	38.6	**0.09**	**-0.13**	**-0.14**	**0.07**
Slovak Republic	27.9	46.8	57.6	0.05	**-0.13**	**-0.10**	**0.11**
Uruguay	50.6	47.2	76.7	**0.06**	**-0.13**	**-0.12**	**0.07**
Czech Republic	30.3	57.6	55.3	**0.10**	**-0.13**	**-0.08**	**0.12**
Sweden	37.0	64.9	42.3	**0.09**	**-0.13**	**-0.11**	0.09
Argentina	37.9	37.8	80.0	-0.06	**-0.14**	**-0.08**	0.00
Lithuania	47.6	53.4	57.4	**0.07**	**-0.14**	**-0.17**	0.01
Luxembourg	35.3	61.3	55.9	0.00	**-0.15**	**-0.09**	**0.09**
Switzerland	48.5	65.8	49.2	0.05	**-0.16**	**-0.09**	**0.13**
Germany	39.0	64.9	53.2	0.04	**-0.24**	**-0.11**	**0.17**
Austria	23.8	63.1	55.4	-0.01	**-0.25**	-0.02	**0.22**
Liechtenstein	56.2	65.6	49.8	-0.10	**-0.32**	0.02	0.25
Norway	32.2	57.0	53.5	m	m	m	m

Notes: The *index of familiarity with mathematics* is based on students' responses to 13 items measuring students' self-reported familiarity with mathematics concepts (such as exponential functions, divisor, quadratic function, etc.).
The *index of mathematics self-concept* is based on the degree to which students agreed with the statements: "I'm just not good in mathematics"; "I get good grades in mathematics"; "I learn mathematics quickly"; "I have always believed that mathematics is one of my best subjects"; and "In my mathematics class, I understand even the most difficult work".
The *index of mathematics anxiety* is based on the degree to which students agreed with the statements: "I often worry that it will be difficult for me in mathematics classes"; "I get very tense when I have to do mathematics homework"; "I get very nervous doing mathematics problems"; "I feel helpless when doing a mathematics problem"; and "I worry that I will get poor marks in mathematics".
The OECD average of the percentage of students who agreed or strongly agreed with the statement "I do mathematics because I enjoy it" is based on all OECD countries. The corresponding OECD average reported in Table 4.1 is based on the OECD countries that participated in both PISA 2003 and PISA 2012.
Statistically significant values are indicated in bold.
Countries/economies are ranked in descending order of the change in mathematics self-concept associated with a one-unit increase in familiarity with mathematics after accounting for performance in mathematics.
Source: OECD, PISA 2012 Database, Tables 4.1, 4.2, 4.3, 4.6 and 4.9.
StatLink http://dx.doi.org/10.1787/888933377700