

Exhibit 3.6: Differences in Achievement for Mathematics Content Domains Across Assessment Years

Instructions: Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▼) than the performance in the column year.

Country	Number Average Scale Score	Number		Algebra Average Scale Score	Algebra		Geometry Average Scale Score	Geometry		Data and Chance Average Scale Score	Data and Chance				
		Differences Between Years			Differences Between Years			Differences Between Years			Differences Between Years				
		2011	2007		2011	2007		2011	2007		2011	2007			
Australia															
2015	511 (3.2)	-1	8	491 (3.4)	2	16 ▲	500 (3.1)	1	12 ▲	519 (3.1)	-16 ▼	-7			
2011	513 (5.5)		9	489 (5.3)		15 ▲	499 (5.3)		11	534 (6.0)		8			
2007	504 (4.0)			474 (4.2)			488 (4.0)			526 (4.4)					
Bahrain															
2015	436 (2.0)	39 ▲	54 ▲	483 (2.1)	58 ▲	86 ▲	449 (2.5)	51 ▲	46 ▲	453 (2.2)	46 ▲	53 ▲			
ψ **	397 (1.7)		15 ▲	424 (1.7)		28 ▲	398 (2.5)		-5	407 (2.5)		8 ▲			
2007	381 (2.5)			397 (1.7)			403 (2.9)			400 (2.6)					
Botswana (9)															
ψ	393 (3.2)	1		400 (2.3)	-7		377 (2.5)	-4		374 (3.1)	-17 ▼				
ψ	392 (3.2)			407 (3.2)			381 (3.1)			391 (3.0)					
Chile															
ψ	427 (3.3)	15 ▲		413 (3.4)	11 ▲		428 (3.4)	9		429 (3.8)	4				
2011	413 (2.9)			403 (3.6)			419 (3.0)			426 (3.0)					
Chinese Taipei															
2015	590 (2.4)	-8	4	613 (2.8)	-15 ▼	-16 ▼	607 (2.6)	-18 ▼	2	588 (2.5)	4	9			
2011	598 (3.2)		12 ▲	628 (3.8)		-1	625 (3.7)		20 ▲	584 (2.9)		5			
2007	586 (4.3)			629 (5.9)			605 (5.7)			579 (4.6)					
Egypt															
ψ	393 (3.7)		8	420 (4.3)		15 ▲	393 (4.1)		-4	338 (4.4)		-20 ▼			
2007	386 (3.6)			405 (3.5)			397 (3.7)			358 (3.9)					
England															
2015	528 (4.5)	15 ▲	17 ▲	492 (4.7)	3	-4	514 (4.1)	16 ▲	1	541 (4.7)	-2	-11			
‡	512 (5.9)		1	489 (5.8)		-7	498 (5.9)		-15 ▼	543 (7.0)		-9			
†	511 (5.4)			496 (5.1)			513 (5.2)			552 (6.2)					
Georgia															
1 2	457 (3.4)	22 ▲	40 ▲	469 (3.8)	18 ▲	52 ▲	441 (3.9)	34 ▲	39 ▲	421 (3.7)	30 ▲	71 ▲			
1	435 (3.5)		19 ▲	450 (3.9)		34 ▲	406 (4.3)		5	392 (4.5)		42 ▲			
1	416 (5.9)			416 (7.6)			402 (7.1)			350 (5.1)					
Hong Kong SAR															
2015	594 (4.9)	6	19 ▲	593 (4.7)	10	18 ▲	602 (5.1)	4	22 ▲	597 (5.9)	16 ▲	37 ▲			
2011	588 (3.7)		13	583 (4.0)		8	597 (4.4)		18 ▲	581 (4.1)		21 ▲			
†	575 (6.0)			575 (6.1)			580 (6.1)			560 (5.9)					
Hungary															
2015	518 (4.0)	8	-3	503 (4.1)	6	-5	518 (4.2)	17 ▲	8	519 (3.9)	2	-8			
2011	510 (3.8)		-11	496 (4.0)		-11 ▼	501 (4.1)		-9	517 (4.2)		-10			
2007	520 (3.8)			508 (3.8)			510 (4.0)			527 (3.9)					
Iran, Islamic Rep. of															
ψ	432 (4.7)	30 ▲	44 ▲	437 (5.1)	15 ▲	33 ▲	448 (4.7)	10	33 ▲	417 (5.0)	24 ▲	21 ▲			
ψ	402 (5.0)		14 ▲	422 (4.4)		18 ▲	437 (4.7)		23 ▲	393 (4.9)		-3			
2007	388 (4.4)			405 (4.2)			414 (4.7)			396 (3.8)					
Israel															
3	518 (4.0)	0		517 (4.7)	-4		487 (4.6)	-9		503 (4.9)	-12				
3	518 (4.1)			521 (4.7)			496 (4.4)			515 (4.7)					
Italy															
2	494 (2.7)	-2	14 ▲	481 (3.0)	-10 ▼	21 ▲	504 (3.5)	-8	13 ▲	496 (2.7)	-3	12 ▲			
	496 (2.8)		16 ▲	491 (2.6)		30 ▲	512 (3.5)		21 ▲	499 (3.1)		15 ▲			
2007	480 (3.1)			460 (3.7)			491 (3.6)			485 (3.6)					
Japan															
2015	572 (2.4)	15 ▲	14 ▲	596 (2.8)	26 ▲	29 ▲	598 (2.6)	12 ▲	14 ▲	589 (2.3)	10 ▲	-2			
2011	557 (3.0)		-2	570 (3.1)		3	586 (3.6)		2	579 (3.1)		-11 ▼			
2007	558 (2.4)			567 (2.9)			584 (2.5)			591 (2.7)					

▲ More recent year significantly higher

▼ More recent year significantly lower

Trend results for Kuwait do not include private schools. Trend results for Lithuania do not include students taught in Polish or in Russian. South Africa (9) tested one year later.

* Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%. Such annotations in exhibits with trend data began in 2011, so data from assessments prior to 2011 are not annotated for reservations.

ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%. Such annotations in exhibits with trend data began in 2011, so data from assessments prior to 2011 are not annotated for reservations.

See Appendix C.2 for target population coverage notes 1, 2, and 3. See Appendix C.8 for sampling guidelines and sampling participation notes †, ‡, and §.

♦ Tested the same cohort of students as other countries, but later in the assessment year at the beginning of the next school year.

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study - TIMSS 2015

Exhibit 3.6: Differences in Achievement for Mathematics Content Domains Across Assessment Years (Continued)

Instructions: Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▼) than the performance in the column year.

Country	Number Average Scale Score	Number		Algebra Average Scale Score	Algebra		Geometry Average Scale Score	Geometry		Data and Chance Average Scale Score	Data and Chance				
		Differences Between Years			Differences Between Years			Differences Between Years			Differences Between Years				
		2011	2007		2011	2007		2011	2007		2011	2007			
Jordan															
✗	2015	380 (3.2)	-10 ▼	-32 ▼	418 (3.5)	-14 ▼	-28 ▼	381 (3.4)	-26 ▼	-48 ▼	346 (4.0)	-33 ▼	-60 ▼		
ψ	2011	390 (3.8)		-22 ▼	432 (3.9)		-14 ▼	407 (3.7)		-22 ▼	379 (3.9)		-27 ▼		
	2007	412 (4.8)			445 (4.3)			429 (4.2)			406 (4.3)				
Kazakhstan															
	2015	516 (5.1)	37 ▲		555 (5.6)	49 ▲		529 (6.4)	39 ▲		492 (5.5)	48 ▲			
	2011	479 (4.1)			506 (4.5)			491 (4.5)			444 (4.4)				
Korea, Rep. of															
	2015	601 (2.4)	-17 ▼	9 ▲	612 (2.9)	-4	4	612 (3.4)	0	12 ▲	600 (2.4)	-15 ▼	-1		
	2011	618 (2.7)		25 ▲	617 (3.3)		9	612 (2.8)		12 ▲	616 (2.6)		14 ▲		
	2007	592 (2.5)			608 (3.3)			600 (2.7)			602 (2.6)				
Kuwait															
ψ	2015	376 (4.0)		38 ▲	364 (3.9)		23 ▲	366 (4.2)		-11 ▼	361 (4.3)		22 ▲		
►	2007	338 (2.8)			341 (3.6)			377 (3.0)			339 (5.1)				
Lebanon															
	2015	440 (4.1)	-11 ▼	-13 ▼	466 (4.0)	-5	-2	444 (4.0)	-4	-12 ▼	395 (4.6)	2	7		
	2011	451 (3.8)		-1	471 (3.8)		3	447 (3.8)		-8	393 (5.2)		5		
	2007	453 (3.9)			468 (3.6)			455 (4.2)			388 (5.3)				
Lithuania															
²	2015	512 (2.9)	11 ▲	5	498 (3.5)	6	10 ▲	516 (3.2)	16 ▲	7	524 (2.8)	9 ▲	-1		
¹	2011	501 (2.5)		-6	492 (2.8)		5	500 (3.2)		-9 ▼	515 (2.8)		-10 ▼		
¹	2007	507 (2.8)			487 (2.9)			509 (3.1)			526 (2.9)				
Malaysia															
	2015	472 (3.6)	21 ▲	-22 ▼	467 (3.4)	37 ▲	11	455 (3.9)	23 ▲	-19 ▼	451 (3.8)	22 ▲	-7		
	2011	451 (5.8)		-43 ▼	430 (5.2)		-26 ▼	432 (6.4)		-42 ▼	429 (5.4)		-30 ▼		
	2007	494 (5.5)			455 (4.9)			474 (6.3)			459 (5.0)				
Malta															
	2015	501 (1.6)		2	492 (1.8)		18 ▲	484 (1.7)		-10 ▼	487 (2.6)		5		
	2007	499 (1.1)			475 (1.5)			494 (1.4)			482 (2.1)				
Morocco															
✗	2015	382 (2.1)	3		372 (2.3)	16 ▲		410 (3.0)	20 ▲		353 (2.9)	21 ▲			
✗	2011	379 (2.5)			357 (2.6)			390 (2.5)			332 (1.9)				
New Zealand															
†	2015	500 (3.5)	7		475 (3.5)	3		488 (3.2)	5		509 (3.7)	-5			
	2011	492 (6.0)			472 (5.6)			483 (5.6)			513 (6.9)				
Norway (8)															
	2015	504 (2.2)	11 ▲	19 ▲	423 (2.7)	-9 ▼	-1	477 (2.4)	17 ▲	20 ▲	519 (3.0)	6	17 ▲		
	2011	492 (2.7)		8 ▲	432 (2.6)		8 ▲	461 (3.4)		3	513 (3.6)		11 ▲		
	2007	485 (2.1)			424 (2.7)			458 (2.5)			502 (2.9)				
Oman															
ψ	2015	389 (2.6)	38 ▲	35 ▲	426 (2.7)	43 ▲	43 ▲	415 (2.8)	38 ▲	38 ▲	376 (3.0)	34 ▲	11 ▲		
ψ	2011	351 (2.9)		-4	383 (2.7)		0	377 (2.6)		0	342 (3.0)		-23 ▼		
	2007	354 (3.1)			384 (3.5)			377 (3.5)			365 (4.0)				

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

▲ More recent year significantly higher

▼ More recent year significantly lower

Exhibit 3.6: Differences in Achievement for Mathematics Content Domains Across Assessment Years (Continued)

Instructions: Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▼) than the performance in the column year.

Country	Number Average Scale Score	Number		Algebra Average Scale Score	Algebra		Geometry Average Scale Score	Geometry		Data and Chance Average Scale Score	Data and Chance				
		Differences Between Years			Differences Between Years			Differences Between Years			Differences Between Years				
		2011	2007		2011	2007		2011	2007		2011	2007			
Qatar															
ψ	2015	435 (2.9)	27 ▲		452 (2.6)	27 ▲		433 (3.0)	45 ▲		417 (3.9)	27 ▲			
ψ	2011	408 (3.6)			425 (2.8)			387 (3.4)			390 (3.6)				
Russian Federation															
2	2015	533 (4.5)	-1	23 ▲	558 (5.2)	2	33 ▲	536 (5.6)	3	25 ▲	507 (5.0)	-4			
2	2011	534 (3.4)		25 ▲	556 (3.8)		31 ▲	533 (4.0)		23 ▲	511 (4.0)				
2	2007	510 (4.1)			525 (4.6)			510 (4.8)			483 (4.5)				
Saudi Arabia															
ꝝ	2015	352 (4.5)	-41 ▼		391 (4.4)	-8		342 (5.3)	-22 ▼		361 (4.9)	-25 ▼			
ψ	2011	393 (4.8)			399 (4.9)			364 (5.4)			387 (5.3)				
Singapore															
2	2015	629 (3.2)	18 ▲	24 ▲	623 (3.4)	8	31 ▲	617 (3.5)	8	27 ▲	617 (3.4)	10			
2	2011	611 (3.7)		6	614 (4.1)		23 ▲	609 (4.0)		19 ▲	607 (4.4)				
2	2007	605 (3.8)			591 (4.0)			590 (4.1)			589 (5.2)				
Slovenia															
2	2015	524 (2.4)	13 ▲	20 ▲	498 (2.5)	5	8 ▲	522 (2.8)	18 ▲	22 ▲	525 (2.7)	7			
2	2011	511 (2.5)		7	493 (2.7)		2	504 (3.1)		4	518 (3.3)				
2	2007	504 (2.6)			491 (2.6)			500 (2.9)			509 (2.9)				
South Africa (9)															
ꝝ	2015	368 (4.7)	10		394 (4.3)	32 ▲		364 (4.5)	48 ▲		357 (4.9)	24 ▲			
ꝝ	2011	359 (2.6)			361 (2.6)			315 (3.1)			333 (3.5)				
Sweden															
2	2015	513 (2.9)	9 ▲	7 ▲	482 (3.2)	23 ▲	23 ▲	478 (3.4)	22 ▲	5	512 (3.7)	8			
2	2011	504 (1.8)		-2	459 (2.2)		0	456 (2.3)		-17 ▼	504 (2.8)				
2	2007	505 (1.9)			459 (2.7)			472 (2.8)			526 (3.9)				
Thailand															
2	2015	430 (5.0)	6	-12	429 (5.1)	4	-1	429 (4.9)	14	-8	425 (4.6)	-6			
2	2011	425 (4.7)		-18 ▼	425 (4.4)		-5	415 (5.4)		-22 ▼	431 (4.1)				
2	2007	443 (5.3)			431 (5.6)			437 (5.9)			438 (4.9)				
Turkey															
2	2015	447 (4.6)	13 ▲		459 (4.6)	4		463 (4.9)	8		467 (5.2)	-1			
2	2011	435 (4.0)			455 (4.3)			454 (4.4)			467 (4.0)				
United Arab Emirates															
2	2015	464 (1.9)	5		485 (2.0)	17 ▲		447 (2.4)	17 ▲		449 (2.5)	9 ▲			
2	2011	459 (2.3)			468 (2.2)			431 (2.4)			440 (2.4)				
United States															
†	2015	520 (3.1)	6	6	525 (3.1)	13 ▲	18 ▲	500 (3.2)	15 ▲	20 ▲	522 (3.5)	-5			
2	2011	514 (3.0)		0	512 (2.6)		5	485 (2.7)		5	527 (3.3)				
2 †	2007	514 (2.9)			507 (3.1)			480 (2.9)			533 (3.4)				
Benchmarking Participants															
Ontario, Canada															
2	2015	530 (3.0)	11 ▲	2	507 (3.0)	11 ▲	11 ▲	524 (3.5)	12 ▲	13 ▲	531 (3.9)	0			
2	2011	519 (2.8)		-9	497 (2.4)		1	512 (2.8)		1	531 (4.2)				
2	2007	528 (4.2)			496 (3.9)			510 (4.5)			547 (5.1)				
Quebec, Canada															
‡	2015	557 (4.3)	14 ▲	19 ▲	530 (4.4)	15 ▲	18 ▲	540 (4.3)	12 ▲	13 ▲	546 (5.0)	-2			
2	2011	543 (2.4)		5	516 (2.9)		4	529 (2.6)		1	549 (3.0)				
3	2007	537 (3.7)			512 (3.6)			527 (3.5)			540 (3.8)				
Abu Dhabi, UAE															
2	2015	443 (4.4)	-10		462 (4.5)	3		425 (5.4)	1		426 (5.5)	-8			
2	2011	452 (4.0)			459 (3.9)			424 (4.5)			434 (4.3)				
Dubai, UAE															
2	2015	509 (2.5)	29 ▲	50 ▲	528 (2.7)	40 ▲	53 ▲	496 (2.6)	44 ▲	51 ▲	504 (3.0)	36 ▲			
2	2011	479 (2.4)		21 ▲	489 (2.4)		13 ▲	453 (3.1)		7	468 (2.9)				
‡	2007	458 (3.3)			476 (2.6)			445 (3.6)			444 (3.5)				
Florida, US															
1	2015	498 (6.6)	-19 ▼		502 (6.8)	-11		470 (6.5)	-29 ▼		489 (8.1)	-39 ▼			
1 2	2011	517 (7.0)			513 (6.6)			499 (6.9)			528 (8.8)				

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

▲ More recent year significantly higher

▼ More recent year significantly lower