

Exhibit 3.4: Achievement in Mathematics Cognitive Domains

Country	Overall Mathematics Average Scale Score	Knowing (69 items)		Applying (94 items)		Reasoning (46 items)		
		Average Scale Score	Difference from Overall Mathematics Score	Average Scale Score	Difference from Overall Mathematics Score	Average Scale Score	Difference from Overall Mathematics Score	
² Singapore	621 (3.2)	633 (3.4)	12 (0.7) ▲	619 (3.2)	-2 (1.6)	616 (3.7)	-5 (1.6) ▼	
Korea, Rep. of	606 (2.6)	607 (2.8)	1 (1.2)	606 (2.8)	0 (1.1)	608 (2.7)	2 (1.3)	
Chinese Taipei	599 (2.4)	598 (2.9)	-1 (1.2)	602 (2.5)	3 (0.7) ▲	602 (2.5)	3 (1.1) ▲	
Hong Kong SAR	594 (4.6)	600 (5.1)	5 (2.1) ▲	595 (4.5)	1 (1.1)	591 (5.1)	-3 (1.4) ▼	
Japan	586 (2.3)	578 (2.6)	-9 (1.2) ▼	592 (2.3)	5 (0.8) ▲	591 (2.6)	4 (1.5) ▲	
Russian Federation	538 (4.7)	543 (5.6)	5 (1.4) ▲	541 (4.6)	3 (0.8) ▲	528 (5.0)	-10 (1.2) ▼	
Kazakhstan	528 (5.3)	533 (6.3)	5 (2.0) ▲	527 (5.4)	-1 (1.1)	525 (5.5)	-3 (1.5) ▼	
¹ † Canada	527 (2.2)	520 (2.3)	-7 (0.9) ▼	528 (2.2)	1 (0.7)	534 (2.4)	7 (1.0) ▲	
Ireland	523 (2.7)	527 (3.0)	4 (1.8) ▲	520 (3.0)	-3 (1.1) ▼	521 (3.1)	-2 (1.9)	
† United States	518 (3.1)	528 (3.5)	10 (1.2) ▲	515 (3.2)	-4 (0.6) ▼	514 (3.1)	-4 (0.8) ▼	
England	518 (4.2)	513 (4.1)	-5 (0.9) ▼	519 (4.1)	1 (1.0)	522 (4.4)	4 (1.9) ▲	
Slovenia	516 (2.1)	518 (2.4)	2 (1.3)	514 (2.1)	-2 (0.8) ▼	516 (2.7)	0 (1.5)	
Hungary	514 (3.8)	511 (3.9)	-3 (1.3) ▼	516 (3.8)	2 (1.1)	515 (3.9)	1 (1.4)	
Norway (9)	512 (2.3)	500 (2.3)	-11 (1.2) ▼	516 (2.3)	5 (1.1) ▲	516 (2.5)	4 (1.5) ▲	
² Lithuania	511 (2.8)	502 (3.1)	-9 (2.0) ▼	520 (2.6)	9 (1.0) ▲	501 (3.0)	-10 (1.5) ▼	
³ Israel	511 (4.1)	511 (4.2)	0 (1.2)	512 (4.0)	1 (0.8)	510 (4.4)	-1 (1.5) ▼	
Australia	505 (3.1)	504 (3.1)	-1 (1.5)	502 (3.0)	-3 (1.0) ▼	512 (3.1)	7 (1.2) ▲	
Sweden	501 (2.8)	484 (2.8)	-16 (1.0) ▼	507 (2.8)	6 (1.2) ▲	509 (3.5)	9 (2.3) ▲	
² Italy	494 (2.5)	489 (2.7)	-6 (1.4) ▼	495 (2.6)	1 (1.2)	500 (2.8)	6 (1.2) ▲	
Malta	494 (1.0)	499 (1.5)	5 (1.0) ▲	493 (1.5)	0 (1.4)	484 (2.2)	-9 (1.9) ▼	
† New Zealand	493 (3.4)	488 (3.4)	-5 (1.1) ▼	493 (3.3)	0 (1.3)	499 (3.5)	6 (1.6) ▲	
Armenia	471 (3.2)	479 (3.4)	7 (1.2) ▲	467 (3.1)	-5 (1.1) ▼	458 (3.9)	-13 (2.0) ▼	
Malaysia	465 (3.6)	472 (3.8)	7 (0.7) ▲	463 (3.6)	-2 (1.0) ▼	453 (3.7)	-12 (1.3) ▼	
United Arab Emirates	465 (2.0)	476 (2.2)	11 (1.0) ▲	457 (2.1)	-7 (0.9) ▼	461 (2.2)	-4 (1.1) ▼	
Turkey	458 (4.7)	447 (4.9)	-11 (1.6) ▼	460 (4.3)	2 (1.4)	472 (4.8)	15 (1.5) ▲	
Bahrain	454 (1.4)	463 (2.3)	9 (2.0) ▲	445 (1.7)	-9 (1.2) ▼	452 (2.2)	-2 (2.0)	
¹ ² Georgia	453 (3.4)	456 (4.1)	3 (1.8)	454 (3.6)	1 (1.5)	441 (4.5)	-13 (2.1) ▼	
Lebanon	442 (3.6)	456 (3.8)	13 (1.3) ▲	439 (3.9)	-4 (1.4) ▼	406 (4.5)	-37 (2.1) ▼	
ψ Qatar	437 (3.0)	440 (3.1)	3 (1.8)	435 (2.9)	-2 (2.0)	431 (2.8)	-6 (2.0) ▼	
ψ Iran, Islamic Rep. of	436 (4.6)	435 (4.9)	-1 (2.2)	434 (4.4)	-2 (1.8)	436 (4.7)	0 (1.8)	
Thailand	431 (4.8)	425 (5.1)	-6 (1.2) ▼	431 (4.7)	0 (1.5)	435 (4.8)	4 (1.7) ▲	
ψ Chile	427 (3.2)	423 (3.4)	-5 (2.3) ▼	427 (3.3)	-1 (2.4)	432 (3.3)	4 (2.3)	
ψ Oman	403 (2.4)	401 (3.1)	-2 (1.9) ▼	401 (2.5)	-2 (1.2) ▼	402 (3.1)	-1 (1.8)	
ψ Kuwait	392 (4.6)	398 (4.7)	5 (2.0) ▲	389 (4.5)	-3 (2.3)	374 (4.5)	-19 (2.1) ▼	
ψ Egypt	392 (4.1)	399 (4.3)	7 (1.2) ▲	385 (3.9)	-7 (1.0) ▼	379 (4.3)	-13 (1.8) ▼	
ψ Botswana (9)	391 (2.0)	394 (3.0)	3 (1.9)	385 (2.3)	-5 (1.3) ▼	389 (2.0)	-2 (1.0)	
⌘ Jordan	386 (3.2)	391 (3.2)	5 (1.4) ▲	378 (3.2)	-7 (1.2) ▼	380 (3.3)	-6 (1.9) ▼	
⌘ Morocco	384 (2.3)	382 (2.4)	-2 (1.9)	385 (2.2)	1 (1.5)	374 (2.8)	-10 (1.9) ▼	
⌘ South Africa (9)	372 (4.5)	371 (5.2)	-1 (1.1)	362 (4.6)	-10 (1.3) ▼	383 (4.2)	11 (1.4) ▲	
⌘ Saudi Arabia	368 (4.6)	359 (4.9)	-8 (1.6) ▼	364 (4.2)	-4 (2.4)	374 (4.0)	6 (2.0) ▲	
Benchmarking Participants								
‡ Quebec, Canada	543 (3.9)	541 (4.2)	-3 (1.8)	546 (4.0)	3 (1.4) ▲	538 (4.2)	-5 (2.1) ▼	
Ontario, Canada	522 (2.9)	513 (3.0)	-9 (1.3) ▼	522 (2.8)	0 (1.3)	534 (3.1)	12 (1.2) ▲	
Dubai, UAE	512 (2.1)	521 (2.3)	9 (1.3) ▲	505 (2.5)	-7 (1.3) ▼	509 (2.8)	-2 (2.0)	
¹ Florida, US	493 (6.4)	501 (7.3)	8 (2.9) ▲	488 (6.7)	-5 (1.7) ▼	491 (6.6)	-3 (2.8)	
Norway (8)	487 (2.0)	476 (2.6)	-10 (2.2) ▼	492 (2.3)	5 (1.7) ▲	488 (2.3)	1 (1.4)	
Abu Dhabi, UAE	442 (4.7)	453 (4.8)	12 (1.6) ▲	434 (4.7)	-8 (1.1) ▼	440 (4.7)	-2 (1.4)	
† ⌘ Buenos Aires, Argentina	396 (4.2)	397 (4.4)	1 (1.6)	392 (4.8)	-4 (2.2)	383 (5.3)	-14 (2.3) ▼	

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

- ▲ Subscale score significantly higher than overall mathematics score
- ▼ Subscale score significantly lower than overall mathematics score

Numbers of items are based on the TIMSS 2015 eighth grade mathematics assessment items included in scaling.

⌘ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.

ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

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 ‡.

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