

**Exhibit 3.3: Achievement in Mathematics Cognitive Domains**

Country	Overall Mathematics Average Scale Score	Knowing (64 items)		Applying (72 items)		Reasoning (33 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
<sup>2</sup> Singapore	618 (3.8)	631 (4.0)	13 (1.4) ●	619 (4.0)	2 (1.0)	603 (4.5)	-15 (1.4) ▼
<sup>†</sup> Hong Kong SAR	615 (2.9)	618 (3.1)	4 (1.3) ●	621 (3.1)	6 (1.3) ●	600 (3.2)	-15 (1.5) ▼
Korea, Rep. of	608 (2.2)	627 (2.9)	19 (1.4) ●	595 (2.1)	-13 (1.2) ▼	619 (2.5)	11 (2.0) ●
Chinese Taipei	597 (1.9)	620 (2.3)	24 (1.9) ●	593 (2.1)	-3 (1.5) ▼	576 (3.1)	-21 (2.0) ▼
Japan	593 (2.0)	601 (2.4)	9 (1.3) ●	589 (2.1)	-4 (1.2) ▼	595 (2.7)	2 (1.9)
<sup>‡</sup> Northern Ireland	570 (2.9)	582 (3.9)	11 (1.6) ●	575 (3.2)	5 (1.2) ●	550 (3.3)	-21 (1.9) ▼
Russian Federation	564 (3.4)	556 (3.4)	-7 (1.0) ▼	566 (3.7)	3 (1.7)	570 (4.0)	6 (1.8) ●
Norway (5)	549 (2.5)	544 (3.1)	-5 (1.9) ▼	550 (2.6)	1 (1.1)	556 (2.9)	7 (2.2) ●
Ireland	547 (2.1)	554 (2.9)	7 (2.2) ●	549 (2.2)	1 (1.2)	535 (2.7)	-12 (1.7) ▼
England	546 (2.8)	554 (3.3)	8 (1.5) ●	544 (3.2)	-2 (1.7)	540 (3.2)	-6 (2.0) ▼
<sup>†</sup> Belgium (Flemish)	546 (2.1)	554 (2.3)	8 (0.8) ●	544 (2.2)	-2 (1.1)	536 (2.7)	-10 (1.4) ▼
Kazakhstan	544 (4.5)	546 (4.4)	1 (1.3)	541 (4.9)	-4 (1.3) ▼	553 (4.6)	9 (1.6) ●
<sup>2</sup> Portugal	541 (2.2)	548 (2.6)	6 (1.9) ●	540 (2.4)	-2 (1.2)	532 (2.3)	-10 (1.3) ▼
<sup>2 †</sup> United States	539 (2.3)	547 (2.3)	8 (1.2) ●	537 (2.4)	-2 (1.0)	531 (2.5)	-9 (1.3) ▼
<sup>2 †</sup> Denmark	539 (2.7)	536 (3.3)	-3 (1.6) ▼	538 (2.8)	-1 (1.7)	548 (3.2)	9 (2.0) ●
<sup>2</sup> Lithuania	535 (2.5)	532 (2.5)	-3 (1.1) ▼	537 (2.7)	1 (1.3)	534 (2.8)	-1 (1.4) ▼
Finland	535 (2.0)	530 (2.2)	-5 (1.4) ▼	536 (2.1)	1 (1.0)	540 (3.1)	5 (2.2) ●
Poland	535 (2.1)	517 (2.4)	-18 (1.0) ▼	541 (2.1)	6 (0.7) ●	546 (2.3)	11 (1.3) ●
<sup>†</sup> Netherlands	530 (1.7)	521 (1.8)	-9 (0.8) ▼	531 (1.7)	1 (1.4)	543 (2.6)	13 (2.4) ●
Hungary	529 (3.2)	532 (3.1)	3 (1.2) ●	526 (3.3)	-3 (1.0) ▼	529 (3.6)	0 (1.5)
Czech Republic	528 (2.2)	519 (2.5)	-9 (1.2) ▼	528 (2.4)	0 (0.9)	544 (3.0)	16 (1.9) ●
Bulgaria	524 (5.3)	527 (5.1)	3 (1.7)	523 (5.6)	-2 (1.8)	521 (5.8)	-4 (1.8) ▼
Cyprus	523 (2.7)	519 (2.8)	-4 (1.7) ▼	529 (2.8)	6 (1.6) ●	519 (3.1)	-4 (1.6) ▼
Germany	522 (2.0)	524 (2.3)	2 (0.9) ●	515 (2.2)	-6 (1.2) ▼	535 (2.4)	13 (1.6) ●
Slovenia	520 (1.9)	517 (1.9)	-3 (1.2) ▼	521 (2.1)	1 (0.8)	524 (2.2)	4 (1.2) ●
<sup>2</sup> Sweden	519 (2.8)	501 (3.4)	-18 (1.8) ▼	521 (2.7)	3 (0.9) ●	542 (3.3)	23 (1.5) ●
<sup>3</sup> Serbia	518 (3.5)	513 (3.5)	-5 (1.7) ▼	521 (3.4)	3 (1.4) ●	517 (3.8)	-1 (1.8)
Australia	517 (3.1)	509 (3.5)	-8 (1.6) ▼	521 (3.0)	4 (1.2) ●	523 (3.0)	6 (1.7) ●
<sup>1 2 †</sup> Canada	511 (2.3)	505 (2.4)	-5 (0.7) ▼	510 (2.3)	0 (0.6)	521 (2.4)	10 (0.7) ●
<sup>2</sup> Italy	507 (2.6)	511 (2.9)	4 (1.0) ●	504 (2.5)	-3 (1.7)	503 (3.3)	-4 (3.0)
<sup>2</sup> Spain	505 (2.5)	505 (2.4)	0 (1.2)	505 (2.4)	0 (0.9)	502 (2.5)	-3 (0.9) ▼
Croatia	502 (1.8)	502 (1.9)	0 (1.2)	499 (1.9)	-4 (1.2) ▼	507 (2.1)	5 (1.1) ●
Slovak Republic	498 (2.5)	491 (2.4)	-8 (1.3) ▼	497 (2.5)	-2 (1.0)	515 (2.9)	17 (1.8) ●
New Zealand	491 (2.3)	475 (2.6)	-15 (1.3) ▼	497 (2.5)	6 (1.5) ●	504 (2.7)	13 (1.3) ●
France	488 (2.9)	484 (2.8)	-4 (0.9) ▼	488 (3.1)	0 (1.0)	491 (3.4)	3 (2.2)
Turkey	483 (3.1)	491 (3.4)	8 (1.5) ●	482 (3.5)	-1 (2.0)	466 (3.5)	-17 (2.0) ▼
<sup>1</sup> Georgia	463 (3.6)	466 (4.0)	3 (1.8)	461 (4.1)	-2 (2.4)	452 (4.4)	-11 (2.1) ▼
Chile	459 (2.4)	449 (2.8)	-10 (1.8) ▼	462 (2.4)	4 (1.2) ●	466 (2.3)	7 (1.2) ●
United Arab Emirates	452 (2.4)	453 (2.7)	1 (1.0)	452 (2.5)	1 (0.7)	445 (2.4)	-6 (1.0) ▼
<sup>2</sup> Bahrain	451 (1.6)	453 (1.8)	2 (1.2)	450 (1.6)	-1 (0.9)	447 (2.0)	-4 (1.4) ▼
Qatar	439 (3.4)	444 (3.4)	5 (1.2) ●	434 (3.5)	-5 (1.0) ▼	431 (4.4)	-8 (3.0) ▼
Iran, Islamic Rep. of	431 (3.2)	429 (3.2)	-3 (1.7) ▼	435 (2.9)	3 (1.4) ●	426 (3.3)	-5 (1.8) ▼
Oman	425 (2.5)	422 (2.7)	-3 (1.0) ▼	428 (2.4)	2 (1.2) ●	420 (2.4)	-6 (1.1) ▼
Indonesia	397 (3.7)	395 (4.2)	-3 (1.8) ▼	397 (3.6)	0 (1.0)	397 (3.5)	-1 (1.2)
Jordan	388 (3.1)	389 (3.1)	1 (0.9)	388 (3.1)	0 (1.1)	385 (3.3)	-3 (1.9)
<sup>ψ</sup> Saudi Arabia	383 (4.1)	374 (4.6)	-10 (2.0) ▼	382 (4.5)	-2 (2.1)	383 (4.3)	-1 (2.4)
Morocco	377 (3.4)	377 (3.7)	-1 (1.2)	375 (3.6)	-3 (0.9) ▼	379 (3.6)	2 (1.7)
South Africa (5)	376 (3.5)	378 (3.6)	2 (0.6) ●	377 (3.4)	1 (0.7)	369 (3.5)	-7 (0.9) ▼
<sup>ψ</sup> Kuwait	353 (4.6)	354 (4.5)	1 (1.6)	348 (4.8)	-5 (1.7) ▼	332 (5.0)	-21 (1.5) ▼

● 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 fourth grade mathematics assessment items included in scaling.

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.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 for sampling guidelines and sampling participation notes †, ‡, and §.

( ) 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 3.3: Achievement in Mathematics Cognitive Domains (Continued)**

Country	Overall Mathematics Average Scale Score	Knowing (64 items)		Applying (72 items)		Reasoning (33 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	
<b>Benchmarking Participants</b>								
<sup>1</sup> Florida, US	546 (4.7)	555 (5.2)	9 (2.8) ▲	545 (4.9)	-2 (1.6)	534 (6.2)	-12 (3.7) ▼	
<sup>‡</sup> Quebec, Canada	536 (4.0)	542 (4.3)	6 (1.9) ▲	533 (4.1)	-3 (1.3) ▼	536 (4.9)	1 (2.3)	
Ontario, Canada	512 (2.3)	505 (2.5)	-8 (1.0) ▼	513 (2.3)	1 (0.8)	524 (2.6)	12 (1.0) ▲	
Dubai, UAE	511 (1.4)	514 (2.0)	3 (1.6)	510 (1.8)	0 (1.5)	507 (1.7)	-4 (1.1) ▼	
Norway (4)	493 (2.3)	479 (2.6)	-14 (1.3) ▼	495 (2.5)	2 (1.9)	506 (3.0)	13 (2.0) ▲	
Buenos Aires, Argentina	432 (2.9)	432 (2.9)	0 (1.3)	427 (3.0)	-5 (0.9) ▼	437 (3.4)	5 (1.8) ▲	
<sup>2</sup> <sup>ψ</sup> Abu Dhabi, UAE	419 (4.7)	418 (5.1)	-1 (1.3)	422 (4.8)	2 (1.8)	414 (4.4)	-6 (1.4) ▼	

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

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