

# Appendix B

*Multiple Comparisons of Average  
Achievement in Mathematics Content  
And Cognitive Domains*

Exhibit B.1: Multiple Comparisons of Average Achievement in Number

TIMSS2007  
Mathematics 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Country	Average Scale Score	Singapore	Hong Kong SAR	Chinese Taipei	Japan	Kazakhstan	Russian Federation	Latvia	Netherlands	Lithuania	England	United States	Armenia	Germany	Hungary	Denmark	Italy	Austria	Australia	Slovak Republic	Sweden	Slovenia	Czech Republic	Scotland	Ukraine	New Zealand	Georgia	Norway	Iran, Islamic Rep. of	Algeria	
Singapore	611 (4.3)																														
Hong Kong SAR	606 (3.8)																														
Chinese Taipei	581 (1.9)	▼	▼																												
Japan	561 (2.2)	▼	▼	▼																											
Kazakhstan	556 (6.6)	▼	▼	▼																											
Russian Federation	546 (4.4)	▼	▼	▼	▼																										
Latvia	536 (2.1)	▼	▼	▼	▼	▼																									
Netherlands	535 (2.2)	▼	▼	▼	▼	▼																									
Lithuania	533 (2.3)	▼	▼	▼	▼	▼																									
England	531 (3.2)	▼	▼	▼	▼	▼																									
United States	524 (2.7)	▼	▼	▼	▼	▼																									
Armenia	522 (4.0)	▼	▼	▼	▼	▼																									
Germany	521 (2.2)	▼	▼	▼	▼	▼																									
Hungary	510 (3.7)	▼	▼	▼	▼	▼																									
Denmark	509 (2.9)	▼	▼	▼	▼	▼																									
Italy	505 (3.2)	▼	▼	▼	▼	▼																									
Austria	502 (2.2)	▼	▼	▼	▼	▼																									
Australia	496 (3.7)	▼	▼	▼	▼	▼																									
Slovak Republic	495 (3.9)	▼	▼	▼	▼	▼																									
Sweden	490 (2.5)	▼	▼	▼	▼	▼																									
Slovenia	485 (1.9)	▼	▼	▼	▼	▼																									
Czech Republic	482 (2.8)	▼	▼	▼	▼	▼																									
Scotland	481 (2.6)	▼	▼	▼	▼	▼																									
Ukraine	480 (2.9)	▼	▼	▼	▼	▼																									
New Zealand	478 (2.7)	▼	▼	▼	▼	▼																									
Georgia	464 (3.8)	▼	▼	▼	▼	▼																									
Norway	461 (2.8)	▼	▼	▼	▼	▼																									
Iran, Islamic Rep. of	398 (3.6)	▼	▼	▼	▼	▼																									
Algeria	391 (5.0)	▼	▼	▼	▼	▼																									
Colombia	360 (4.3)	▼	▼	▼	▼	▼																									
Morocco	353 (4.7)	▼	▼	▼	▼	▼																									
Tunisia	352 (4.5)	▼	▼	▼	▼	▼																									
Kuwait	321 (3.5)	▼	▼	▼	▼	▼																									
El Salvador	317 (3.9)	▼	▼	▼	▼	▼																									
Qatar	292 (1.2)	▼	▼	▼	▼	▼																									
Yemen	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<b>Benchmarking Participants</b>																															
Massachusetts, US	571 (4.0)	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Minnesota, US	546 (6.2)	▼	▼	▼	▼																										
Quebec, Canada	511 (3.0)	▼	▼	▼	▼	▼																									
British Columbia, Canada	493 (2.8)	▼	▼	▼	▼	▼																									
Alberta, Canada	489 (3.3)	▼	▼	▼	▼	▼																									
Ontario, Canada	489 (3.6)	▼	▼	▼	▼	▼																									
Dubai, UAE	444 (2.0)	▼	▼	▼	▼	▼																									

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Note: 5% of these comparisons would be statistically significant by chance alone. A plus (+) sign indicates average achievement could not be accurately estimated.

Exhibit B.1: Multiple Comparisons of Average Achievement in Number (Continued)

TIMSS2007  
Mathematics 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Colombia	Morocco	Tunisia	Kuwait	El Salvador	Qatar	Yemen	Benchmarking Participants	Average Scale Score	Country
+	+	+	+	+	+	+	Massachusetts, US	611 (4.3)	Singapore
+	+	+	+	+	+	+	Minnesota, US	606 (3.8)	Hong Kong SAR
+	+	+	+	+	+	+	Quebec, Canada	581 (1.9)	Chinese Taipei
+	+	+	+	+	+	+	British Columbia, Canada	561 (2.2)	Japan
+	+	+	+	+	+	+	Alberta, Canada	556 (6.6)	Kazakhstan
+	+	+	+	+	+	+	Ontario, Canada	546 (4.4)	Russian Federation
+	+	+	+	+	+	+	Dubai, UAE	536 (2.1)	Latvia
+	+	+	+	+	+	+		535 (2.2)	Netherlands
+	+	+	+	+	+	+		533 (2.3)	Lithuania
+	+	+	+	+	+	+		531 (3.2)	England
+	+	+	+	+	+	+		524 (2.7)	United States
+	+	+	+	+	+	+		522 (4.0)	Armenia
+	+	+	+	+	+	+		521 (2.2)	Germany
+	+	+	+	+	+	+		510 (3.7)	Hungary
+	+	+	+	+	+	+		509 (2.9)	Denmark
+	+	+	+	+	+	+		505 (3.2)	Italy
+	+	+	+	+	+	+		502 (2.2)	Austria
+	+	+	+	+	+	+		496 (3.7)	Australia
+	+	+	+	+	+	+		495 (3.9)	Slovak Republic
+	+	+	+	+	+	+		490 (2.5)	Sweden
+	+	+	+	+	+	+		485 (1.9)	Slovenia
+	+	+	+	+	+	+		482 (2.8)	Czech Republic
+	+	+	+	+	+	+		481 (2.6)	Scotland
+	+	+	+	+	+	+		480 (2.9)	Ukraine
+	+	+	+	+	+	+		478 (2.7)	New Zealand
+	+	+	+	+	+	+		464 (3.8)	Georgia
+	+	+	+	+	+	+		461 (2.8)	Norway
+	+	+	+	+	+	+		398 (3.6)	Iran, Islamic Rep. of
+	+	+	+	+	+	+		391 (5.0)	Algeria
+	+	+	+	+	+	+		360 (4.3)	Colombia
+	+	+	+	+	+	+		353 (4.7)	Morocco
+	+	+	+	+	+	+		352 (4.5)	Tunisia
+	+	+	+	+	+	+		321 (3.5)	Kuwait
+	+	+	+	+	+	+		317 (3.9)	El Salvador
+	+	+	+	+	+	+		292 (1.2)	Qatar
+	+	+	+	+	+	+		+	Yemen
+	+	+	+	+	+	+	Benchmarking Participants		
+	+	+	+	+	+	+	Massachusetts, US	571 (4.0)	Massachusetts, US
+	+	+	+	+	+	+	Minnesota, US	546 (6.2)	Minnesota, US
+	+	+	+	+	+	+	Quebec, Canada	511 (3.0)	Quebec, Canada
+	+	+	+	+	+	+	British Columbia, Canada	493 (2.8)	British Columbia, Canada
+	+	+	+	+	+	+	Alberta, Canada	489 (3.3)	Alberta, Canada
+	+	+	+	+	+	+	Ontario, Canada	489 (3.6)	Ontario, Canada
+	+	+	+	+	+	+	Dubai, UAE	444 (2.0)	Dubai, UAE

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

▲ Average achievement significantly higher than comparison country    ▼ Average achievement significantly lower than comparison country

**Exhibit B.2 Multiple Comparisons of Average Achievement in Geometric Shapes and Measures**

**TIMSS2007**  
**Mathematics** **4<sup>th</sup>**  
**Grade**

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Country	Average Scale Score	Hong Kong SAR	Singapore	Japan	Chinese Taipei	England	Denmark	Kazakhstan	Russian Federation	Australia	Latvia	Germany	Netherlands	United States	Slovenia	Lithuania	Hungary	Italy	Austria	Sweden	Scotland	New Zealand	Slovak Republic	Czech Republic	Norway	Armenia	Ukraine	Iran, Islamic Rep. of	Georgia	Algeria	
Hong Kong SAR	599 (3.1)		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Singapore	570 (3.6)	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Japan	566 (2.2)	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Chinese Taipei	556 (2.2)	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
England	548 (2.7)	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Denmark	544 (2.6)	▼	▼	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Kazakhstan	542 (7.4)	▼	▼	▼	▼				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Russian Federation	538 (5.1)	▼	▼	▼	▼					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Australia	536 (3.1)	▼	▼	▼	▼	▼				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Latvia	532 (2.6)	▼	▼	▼	▼	▼	▼				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Germany	528 (2.0)	▼	▼	▼	▼	▼					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Netherlands	522 (2.3)	▼	▼	▼	▼	▼	▼	▼				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
United States	522 (2.5)	▼	▼	▼	▼	▼	▼	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Slovenia	522 (1.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Lithuania	518 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Hungary	510 (3.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Italy	509 (3.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Austria	509 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Sweden	508 (2.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Scotland	503 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
New Zealand	502 (2.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Slovak Republic	499 (4.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Czech Republic	494 (2.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Norway	490 (3.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	
Armenia	483 (4.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	
Ukraine	457 (2.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	
Iran, Islamic Rep. of	429 (3.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	
Georgia	415 (4.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	
Algeria	383 (4.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	
Morocco	365 (4.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	
Colombia	361 (4.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	
Tunisia	334 (4.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲
El Salvador	333 (4.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲
Kuwait	316 (3.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲
Qatar	296 (1.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲
Yemen	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<b>Benchmarking Participants</b>																															
Massachusetts, US	564 (4.1)	▼				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Minnesota, US	556 (5.3)	▼	▼				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ontario, Canada	530 (3.0)	▼	▼	▼	▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Quebec, Canada	525 (3.2)	▼	▼	▼	▼	▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Alberta, Canada	512 (2.9)	▼	▼	▼	▼	▼	▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
British Columbia, Canada	510 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Dubai, UAE	440 (2.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Note: 5% of these comparisons would be statistically significant by chance alone. A plus (+) sign indicates average achievement could not be accurately estimated.

**Exhibit B.2 Multiple Comparisons of Average Achievement in Geometric Shapes and Measures (Continued)**

**TIMSS2007**  
Mathematics **4<sup>th</sup>** Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Morocco	Colombia	Tunisia	El Salvador	Kuwait	Qatar	Yemen	Benchmarking Participants	Average Scale Score	Country
▲	▲	▲	▲	▲	▲	+	▼	599 (3.1)	Hong Kong SAR
▲	▲	▲	▲	▲	▲	+	▲	570 (3.6)	Singapore
▲	▲	▲	▲	▲	▲	+		566 (2.2)	Japan
▲	▲	▲	▲	▲	▲	+		556 (2.2)	Chinese Taipei
▲	▲	▲	▲	▲	▲	+	▼	548 (2.7)	England
▲	▲	▲	▲	▲	▲	+	▼	544 (2.6)	Denmark
▲	▲	▲	▲	▲	▲	+	▼	542 (7.4)	Kazakhstan
▲	▲	▲	▲	▲	▲	+	▼	538 (5.1)	Russian Federation
▲	▲	▲	▲	▲	▲	+	▼	536 (3.1)	Australia
▲	▲	▲	▲	▲	▲	+	▼	532 (2.6)	Latvia
▲	▲	▲	▲	▲	▲	+	▼	528 (2.0)	Germany
▲	▲	▲	▲	▲	▲	+	▼	522 (2.3)	Netherlands
▲	▲	▲	▲	▲	▲	+	▼	522 (2.5)	United States
▲	▲	▲	▲	▲	▲	+	▼	522 (1.8)	Slovenia
▲	▲	▲	▲	▲	▲	+	▼	518 (2.4)	Lithuania
▲	▲	▲	▲	▲	▲	+	▼	510 (3.3)	Hungary
▲	▲	▲	▲	▲	▲	+	▼	509 (3.0)	Italy
▲	▲	▲	▲	▲	▲	+	▼	509 (2.4)	Austria
▲	▲	▲	▲	▲	▲	+	▼	508 (2.3)	Sweden
▲	▲	▲	▲	▲	▲	+	▼	503 (2.6)	Scotland
▲	▲	▲	▲	▲	▲	+	▼	502 (2.3)	New Zealand
▲	▲	▲	▲	▲	▲	+	▼	499 (4.3)	Slovak Republic
▲	▲	▲	▲	▲	▲	+	▼	494 (2.8)	Czech Republic
▲	▲	▲	▲	▲	▲	+	▼	490 (3.0)	Norway
▲	▲	▲	▲	▲	▲	+	▼	483 (4.7)	Armenia
▲	▲	▲	▲	▲	▲	+	▼	457 (2.8)	Ukraine
▲	▲	▲	▲	▲	▲	+	▼	429 (3.3)	Iran, Islamic Rep. of
▲	▲	▲	▲	▲	▲	+	▼	415 (4.8)	Georgia
▲	▲	▲	▲	▲	▲	+	▼	383 (4.5)	Algeria
		▲	▲	▲	▲	+	▼	365 (4.3)	Morocco
		▲	▲	▲	▲	+	▼	361 (4.8)	Colombia
▼	▼		▲	▲	▲	+	▼	334 (4.5)	Tunisia
▼	▼		▲	▲	▲	+	▼	333 (4.3)	El Salvador
▼	▼	▼	▼	▼		+	▼	316 (3.6)	Kuwait
▼	▼	▼	▼	▼		+	▼	296 (1.4)	Qatar
+	+	+	+	+	+	+	+	+	Yemen
▲	▲	▲	▲	▲	▲	+		564 (4.1)	Massachusetts, US
▲	▲	▲	▲	▲	▲	+		556 (5.3)	Minnesota, US
▲	▲	▲	▲	▲	▲	+	▼	530 (3.0)	Ontario, Canada
▲	▲	▲	▲	▲	▲	+	▼	525 (3.2)	Quebec, Canada
▲	▲	▲	▲	▲	▲	+	▼	512 (2.9)	Alberta, Canada
▲	▲	▲	▲	▲	▲	+	▼	510 (2.9)	British Columbia, Canada
▲	▲	▲	▲	▲	▲	+	▼	440 (2.8)	Dubai, UAE

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

▲ Average achievement significantly higher than comparison country    ▼ Average achievement significantly lower than comparison country

Exhibit B.3 Multiple Comparisons of Average Achievement in Data Display

TIMSS2007  
Mathematics 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Country	Average Scale Score	Comparison Countries																													
		Hong Kong SAR	Singapore	Japan	Chinese Taipei	England	United States	Netherlands	Latvia	Australia	Germany	Lithuania	Russian Federation	Sweden	Denmark	Kazakhstan	Slovenia	Scotland	New Zealand	Austria	Italy	Hungary	Czech Republic	Slovak Republic	Norway	Ukraine	Armenia	Georgia	Iran, Islamic Rep. of	El Salvador	
Hong Kong SAR	585 (2.7)																														
Singapore	583 (3.2)																														
Japan	578 (2.8)																														
Chinese Taipei	567 (2.0)	▼	▼	▼																											
England	547 (2.5)	▼	▼	▼	▼																										
United States	543 (2.4)	▼	▼	▼	▼																										
Netherlands	543 (2.3)	▼	▼	▼	▼																										
Latvia	536 (3.0)	▼	▼	▼	▼	▼																									
Australia	534 (3.1)	▼	▼	▼	▼	▼	▼																								
Germany	534 (3.1)	▼	▼	▼	▼	▼	▼	▼																							
Lithuania	530 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼																						
Russian Federation	530 (4.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼																					
Sweden	529 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Denmark	529 (3.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																			
Kazakhstan	522 (5.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																		
Slovenia	518 (2.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																	
Scotland	516 (2.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																
New Zealand	513 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼															
Austria	508 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼														
Italy	506 (3.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼													
Hungary	504 (3.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼												
Czech Republic	493 (3.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼											
Slovak Republic	492 (4.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼										
Norway	487 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼									
Ukraine	462 (3.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼								
Armenia	458 (4.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							
Georgia	414 (4.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼						
Iran, Islamic Rep. of	400 (4.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼					
El Salvador	367 (3.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼				
Colombia	363 (5.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼			
Algeria	361 (5.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Qatar	326 (1.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Kuwait	318 (4.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Morocco	316 (6.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Tunisia	307 (4.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Yemen	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<b>Benchmarking Participants</b>																															
Massachusetts, US	571 (4.0)	▼	▼																												
Minnesota, US	557 (4.8)	▼	▼	▼																											
Ontario, Canada	544 (3.4)	▼	▼	▼	▼																										
Alberta, Canada	537 (3.7)	▼	▼	▼	▼	▼																									
British Columbia, Canada	531 (2.8)	▼	▼	▼	▼	▼	▼																								
Quebec, Canada	527 (3.6)	▼	▼	▼	▼	▼	▼	▼																							
Dubai, UAE	461 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼																						

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Note: 5% of these comparisons would be statistically significant by chance alone. A plus (+) sign indicates average achievement could not be accurately estimated.

Exhibit B.3 Multiple Comparisons of Average Achievement in Data Display (Continued)

TIMSS2007 Mathematics 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Colombia	Algeria	Qatar	Kuwait	Morocco	Tunisia	Yemen	Benchmarking Participants	Average Scale Score	Country
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	Massachusetts, US	585 (2.7)	Hong Kong SAR
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	Minnesota, US	583 (3.2)	Singapore
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	Ontario, Canada	578 (2.8)	Japan
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	Alberta, Canada	567 (2.0)	Chinese Taipei
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	British Columbia, Canada	547 (2.5)	England
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	Quebec, Canada	543 (2.4)	United States
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	Dubai, UAE	543 (2.3)	Netherlands
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		536 (3.0)	Latvia
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		534 (3.1)	Australia
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		534 (3.1)	Germany
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		530 (2.9)	Lithuania
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		530 (4.9)	Russian Federation
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		529 (2.7)	Sweden
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		529 (3.4)	Denmark
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		522 (5.8)	Kazakhstan
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		518 (2.5)	Slovenia
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		516 (2.2)	Scotland
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		513 (2.6)	New Zealand
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		508 (2.6)	Austria
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		506 (3.4)	Italy
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		504 (3.5)	Hungary
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		493 (3.3)	Czech Republic
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		492 (4.2)	Slovak Republic
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		487 (2.6)	Norway
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		462 (3.2)	Ukraine
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		458 (4.3)	Armenia
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		414 (4.6)	Georgia
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		400 (4.0)	Iran, Islamic Rep. of
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		367 (3.5)	El Salvador
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		363 (5.9)	Colombia
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		361 (5.2)	Algeria
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		326 (1.6)	Qatar
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		318 (4.7)	Kuwait
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		316 (6.1)	Morocco
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		307 (4.8)	Tunisia
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+		++	Yemen
<b>Benchmarking Participants</b>									
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	Massachusetts, US	571 (4.0)	Massachusetts, US
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	Minnesota, US	557 (4.8)	Minnesota, US
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	Ontario, Canada	544 (3.4)	Ontario, Canada
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	Alberta, Canada	537 (3.7)	Alberta, Canada
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	British Columbia, Canada	531 (2.8)	British Columbia, Canada
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	Quebec, Canada	527 (3.6)	Quebec, Canada
▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	▶▶▶▶▶▶+	Dubai, UAE	461 (2.7)	Dubai, UAE

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

▶ Average achievement significantly higher than comparison country    ◀ Average achievement significantly lower than comparison country

Exhibit B.4 Multiple Comparisons of Average Achievement in Knowing

TIMSS2007  
Mathematics 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Country	Average Scale Score	Singapore	Hong Kong SAR	Chinese Taipei	Japan	Kazakhstan	England	United States	Russian Federation	Latvia	Netherlands	Lithuania	Armenia	Germany	Italy	Denmark	Hungary	Australia	Austria	Slovenia	Slovak Republic	Scotland	Sweden	New Zealand	Czech Republic	Ukraine	Norway	Georgia	Iran, Islamic Rep. of	Algeria
Singapore	620 (4.0)																													
Hong Kong SAR	617 (3.5)																													
Chinese Taipei	584 (1.7)	▼	▼																											
Japan	565 (2.1)	▼	▼	▼																										
Kazakhstan	559 (7.3)	▼	▼	▼																										
England	544 (3.6)	▼	▼	▼	▼																									
United States	541 (2.6)	▼	▼	▼	▼	▼																								
Russian Federation	538 (4.5)	▼	▼	▼	▼	▼																								
Latvia	530 (2.2)	▼	▼	▼	▼	▼	▼																							
Netherlands	525 (2.2)	▼	▼	▼	▼	▼	▼	▼																						
Lithuania	520 (2.8)	▼	▼	▼	▼	▼	▼	▼	▼																					
Armenia	518 (4.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Germany	514 (2.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																			
Italy	514 (3.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																		
Denmark	513 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																	
Hungary	511 (3.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																
Australia	509 (4.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼															
Austria	505 (2.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼														
Slovenia	497 (1.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼													
Slovak Republic	492 (3.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼												
Scotland	489 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼											
Sweden	482 (2.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼										
New Zealand	482 (2.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼									
Czech Republic	473 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼								
Ukraine	472 (3.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							
Norway	461 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼						
Georgia	450 (4.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼					
Iran, Islamic Rep. of	410 (3.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼				
Algeria	384 (5.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼			
Colombia	360 (5.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Morocco	354 (4.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Tunisia	343 (4.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Kuwait	326 (4.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
El Salvador	312 (4.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Qatar	293 (1.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Yemen	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
<b>Benchmarking Participants</b>																														
Massachusetts, US	581 (4.1)	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Minnesota, US	565 (6.2)	▼	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Quebec, Canada	517 (3.2)	▼	▼	▼	▼														▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Ontario, Canada	498 (3.2)	▼	▼	▼	▼	▼																	▲	▲	▲	▲	▲	▲	▲	
British Columbia, Canada	498 (2.5)	▼	▼	▼	▼	▼	▼																▲	▲	▲	▲	▲	▲	▲	
Alberta, Canada	494 (3.1)	▼	▼	▼	▼	▼	▼	▼															▲	▲	▲	▲	▲	▲	▲	
Dubai, UAE	457 (2.1)	▼	▼	▼	▼	▼	▼	▼	▼														▼	▼	▼	▼	▼	▼	▼	

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Note: 5% of these comparisons would be statistically significant by chance alone. A plus (+) sign indicates average achievement could not be accurately estimated.



Exhibit B.4 Multiple Comparisons of Average Achievement in Knowing (Continued)

TIMSS2007 Mathematics 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Colombia	Morocco	Tunisia	Kuwait	El Salvador	Qatar	Yemen	Benchmarking Participants							Average Scale Score	Country
							Massachusetts, US	Minnesota, US	Quebec, Canada	Ontario, Canada	British Columbia, Canada	Alberta, Canada	Dubai, UAE		
▲	▲	▲	▲	▲	▲	+	▲	▲	▲	▲	▲	▲	▲	620 (4.0)	Singapore
▲	▲	▲	▲	▲	▲	+	▲	▲	▲	▲	▲	▲	▲	617 (3.5)	Hong Kong SAR
▲	▲	▲	▲	▲	▲	+	▲	▲	▲	▲	▲	▲	▲	584 (1.7)	Chinese Taipei
▲	▲	▲	▲	▲	▲	+	▼	▲	▲	▲	▲	▲	▲	565 (2.1)	Japan
▲	▲	▲	▲	▲	▲	+	▼	▲	▲	▲	▲	▲	▲	559 (7.3)	Kazakhstan
▲	▲	▲	▲	▲	▲	+	▼	▼	▲	▲	▲	▲	▲	544 (3.6)	England
▲	▲	▲	▲	▲	▲	+	▼	▼	▲	▲	▲	▲	▲	541 (2.6)	United States
▲	▲	▲	▲	▲	▲	+	▼	▼	▲	▲	▲	▲	▲	538 (4.5)	Russian Federation
▲	▲	▲	▲	▲	▲	+	▼	▼	▲	▲	▲	▲	▲	530 (2.2)	Latvia
▲	▲	▲	▲	▲	▲	+	▼	▼	▲	▲	▲	▲	▲	525 (2.2)	Netherlands
▲	▲	▲	▲	▲	▲	+	▼	▲	▲	▲	▲	▲	▲	520 (2.8)	Lithuania
▲	▲	▲	▲	▲	▲	+	▼	▲	▲	▲	▲	▲	▲	518 (4.8)	Armenia
▲	▲	▲	▲	▲	▲	+	▼	▼	▲	▲	▲	▲	▲	514 (2.0)	Germany
▲	▲	▲	▲	▲	▲	+	▼	▲	▲	▲	▲	▲	▲	514 (3.2)	Italy
▲	▲	▲	▲	▲	▲	+	▼	▼	▲	▲	▲	▲	▲	513 (2.7)	Denmark
▲	▲	▲	▲	▲	▲	+	▼	▼	▲	▲	▲	▲	▲	511 (3.4)	Hungary
▲	▲	▲	▲	▲	▲	+	▼	▲	▲	▲	▲	▲	▲	509 (4.2)	Australia
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▲	▲	▲	▲	505 (2.0)	Austria
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▲	▲	▲	▲	497 (1.8)	Slovenia
▲	▲	▲	▲	▲	▲	+	▼	▼	▲	▲	▲	▲	▲	492 (3.9)	Slovak Republic
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▲	▲	▲	489 (2.6)	Scotland
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▼	▲	▲	482 (2.5)	Sweden
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▼	▲	▲	482 (2.5)	New Zealand
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▼	▲	▲	473 (2.4)	Czech Republic
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▼	▲	▲	472 (3.0)	Ukraine
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▼	▲	▲	461 (2.9)	Norway
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▼	▲	▲	450 (4.0)	Georgia
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▼	▼	▼	410 (3.6)	Iran, Islamic Rep. of
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▼	▼	▼	384 (5.4)	Algeria
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▼	▼	▼	360 (5.2)	Colombia
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▼	▼	▼	354 (4.8)	Morocco
▼	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▼	▼	▼	343 (4.9)	Tunisia
▼	▼	▲	▲	▲	▲	+	▼	▼	▼	▼	▼	▼	▼	326 (4.6)	Kuwait
▼	▼	▼	▼	▲	▲	+	▼	▼	▼	▼	▼	▼	▼	312 (4.1)	El Salvador
▼	▼	▼	▼	▼	▲	+	▼	▼	▼	▼	▼	▼	▼	293 (1.3)	Qatar
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	Yemen
<b>Benchmarking Participants</b>															
▲	▲	▲	▲	▲	▲	+	▲	▲	▲	▲	▲	▲	▲	581 (4.1)	Massachusetts, US
▲	▲	▲	▲	▲	▲	+	▼	▲	▲	▲	▲	▲	▲	565 (6.2)	Minnesota, US
▲	▲	▲	▲	▲	▲	+	▼	▼	▲	▲	▲	▲	▲	517 (3.2)	Quebec, Canada
▲	▲	▲	▲	▲	▲	+	▼	▼	▲	▲	▲	▲	▲	498 (3.2)	Ontario, Canada
▲	▲	▲	▲	▲	▲	+	▼	▼	▲	▲	▲	▲	▲	498 (2.5)	British Columbia, Canada
▲	▲	▲	▲	▲	▲	+	▼	▼	▲	▲	▲	▲	▲	494 (3.1)	Alberta, Canada
▲	▲	▲	▲	▲	▲	+	▼	▼	▼	▼	▼	▼	▼	457 (2.1)	Dubai, UAE

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

▲ Average achievement significantly higher than comparison country    ▼ Average achievement significantly lower than comparison country

Exhibit B.5 Multiple Comparisons of Average Achievement in Applying

TIMSS2007  
Mathematics 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Country	Average Scale Score	Hong Kong SAR	Singapore	Chinese Taipei	Japan	Kazakhstan	Russian Federation	England	Latvia	Netherlands	Lithuania	Germany	Denmark	United States	Australia	Sweden	Hungary	Austria	Slovenia	Italy	Scotland	Slovak Republic	Czech Republic	New Zealand	Armenia	Norway	Ukraine	Georgia	Iran, Islamic Rep. of	Algeria	
Hong Kong SAR	599 (3.4)																														
Singapore	590 (3.7)	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Chinese Taipei	569 (1.7)	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Japan	566 (2.0)	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Kazakhstan	547 (7.2)	▼	▼	▼	▼																										
Russian Federation	547 (4.8)	▼	▼	▼	▼																										
England	540 (3.1)	▼	▼	▼	▼																										
Latvia	540 (2.5)	▼	▼	▼	▼																										
Netherlands	540 (2.0)	▼	▼	▼	▼																										
Lithuania	539 (2.4)	▼	▼	▼	▼																										
Germany	531 (2.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Denmark	528 (2.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
United States	524 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Australia	523 (3.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Sweden	508 (2.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Hungary	507 (3.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Austria	507 (1.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Slovenia	504 (1.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Italy	501 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Scotland	500 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Slovak Republic	498 (4.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Czech Republic	496 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
New Zealand	495 (2.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Armenia	493 (4.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Norway	479 (2.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Ukraine	466 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Georgia	433 (4.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Iran, Islamic Rep. of	405 (3.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Algeria	376 (5.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Colombia	357 (5.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Morocco	346 (4.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
El Salvador	339 (3.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Tunisia	329 (4.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Kuwait	305 (4.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Qatar	296 (1.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Yemen	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<b>Benchmarking Participants</b>																															
Massachusetts, US	566 (3.5)	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Minnesota, US	548 (5.5)	▼	▼	▼	▼																										
Quebec, Canada	517 (2.8)	▼	▼	▼	▼																										
Ontario, Canada	515 (3.1)	▼	▼	▼	▼																										
Alberta, Canada	505 (2.9)	▼	▼	▼	▼																										
British Columbia, Canada	505 (2.6)	▼	▼	▼	▼																										
Dubai, UAE	441 (1.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Note: 5% of these comparisons would be statistically significant by chance alone. A plus (+) sign indicates average achievement could not be accurately estimated.

Exhibit B.5 Multiple Comparisons of Average Achievement in Applying (Continued)

TIMSS2007 Mathematics 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Colombia	Morocco	El Salvador	Tunisia	Kuwait	Qatar	Yemen	Benchmarking Participants							Average Scale Score	Country
							Massachusetts, US	Minnesota, US	Quebec, Canada	Ontario, Canada	Alberta, Canada	British Columbia, Canada	Dubai, UAE		
+	+	+	+	+	+	+	+	+	+	+	+	+	+	599 (3.4)	Hong Kong SAR
+	+	+	+	+	+	+	+	+	+	+	+	+	+	590 (3.7)	Singapore
+	+	+	+	+	+	+	+	+	+	+	+	+	+	569 (1.7)	Chinese Taipei
+	+	+	+	+	+	+	+	+	+	+	+	+	+	566 (2.0)	Japan
+	+	+	+	+	+	+	+	+	+	+	+	+	+	547 (7.2)	Kazakhstan
+	+	+	+	+	+	+	+	+	+	+	+	+	+	547 (4.8)	Russian Federation
+	+	+	+	+	+	+	+	+	+	+	+	+	+	540 (3.1)	England
+	+	+	+	+	+	+	+	+	+	+	+	+	+	540 (2.5)	Latvia
+	+	+	+	+	+	+	+	+	+	+	+	+	+	540 (2.0)	Netherlands
+	+	+	+	+	+	+	+	+	+	+	+	+	+	539 (2.4)	Lithuania
+	+	+	+	+	+	+	+	+	+	+	+	+	+	531 (2.2)	Germany
+	+	+	+	+	+	+	+	+	+	+	+	+	+	528 (2.5)	Denmark
+	+	+	+	+	+	+	+	+	+	+	+	+	+	524 (2.6)	United States
+	+	+	+	+	+	+	+	+	+	+	+	+	+	523 (3.5)	Australia
+	+	+	+	+	+	+	+	+	+	+	+	+	+	508 (2.2)	Sweden
+	+	+	+	+	+	+	+	+	+	+	+	+	+	507 (3.5)	Hungary
+	+	+	+	+	+	+	+	+	+	+	+	+	+	507 (1.8)	Austria
+	+	+	+	+	+	+	+	+	+	+	+	+	+	504 (1.9)	Slovenia
+	+	+	+	+	+	+	+	+	+	+	+	+	+	501 (2.9)	Italy
+	+	+	+	+	+	+	+	+	+	+	+	+	+	500 (2.4)	Scotland
+	+	+	+	+	+	+	+	+	+	+	+	+	+	498 (4.0)	Slovak Republic
+	+	+	+	+	+	+	+	+	+	+	+	+	+	496 (2.7)	Czech Republic
+	+	+	+	+	+	+	+	+	+	+	+	+	+	495 (2.3)	New Zealand
+	+	+	+	+	+	+	+	+	+	+	+	+	+	493 (4.1)	Armenia
+	+	+	+	+	+	+	+	+	+	+	+	+	+	479 (2.8)	Norway
+	+	+	+	+	+	+	+	+	+	+	+	+	+	466 (3.1)	Ukraine
+	+	+	+	+	+	+	+	+	+	+	+	+	+	433 (4.5)	Georgia
+	+	+	+	+	+	+	+	+	+	+	+	+	+	405 (3.7)	Iran, Islamic Rep. of
+	+	+	+	+	+	+	+	+	+	+	+	+	+	376 (5.2)	Algeria
+	+	+	+	+	+	+	+	+	+	+	+	+	+	357 (5.1)	Colombia
+	+	+	+	+	+	+	+	+	+	+	+	+	+	346 (4.7)	Morocco
+	+	+	+	+	+	+	+	+	+	+	+	+	+	339 (3.7)	El Salvador
+	+	+	+	+	+	+	+	+	+	+	+	+	+	329 (4.8)	Tunisia
+	+	+	+	+	+	+	+	+	+	+	+	+	+	305 (4.1)	Kuwait
+	+	+	+	+	+	+	+	+	+	+	+	+	+	296 (1.2)	Qatar
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	Yemen
														Benchmarking Participants	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	566 (3.5)	Massachusetts, US
+	+	+	+	+	+	+	+	+	+	+	+	+	+	548 (5.5)	Minnesota, US
+	+	+	+	+	+	+	+	+	+	+	+	+	+	517 (2.8)	Quebec, Canada
+	+	+	+	+	+	+	+	+	+	+	+	+	+	515 (3.1)	Ontario, Canada
+	+	+	+	+	+	+	+	+	+	+	+	+	+	505 (2.9)	Alberta, Canada
+	+	+	+	+	+	+	+	+	+	+	+	+	+	505 (2.6)	British Columbia, Canada
+	+	+	+	+	+	+	+	+	+	+	+	+	+	441 (1.7)	Dubai, UAE

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

⬆ Average achievement significantly higher than comparison country    ⬇ Average achievement significantly lower than comparison country

Exhibit B.6 Multiple Comparisons of Average Achievement in Reasoning

TIMSS2007  
Mathematics 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Country	Average Scale Score	Hong Kong SAR	Singapore	Chinese Taipei	Japan	Russian Federation	Kazakhstan	England	Latvia	Netherlands	Germany	Lithuania	Denmark	United States	Sweden	Australia	Italy	Hungary	Austria	Slovenia	New Zealand	Slovak Republic	Scotland	Czech Republic	Armenia	Norway	Ukraine	Georgia	Iran, Islamic Rep. of	Algeria
Hong Kong SAR	589 (3.5)																													
Singapore	578 (3.8)	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Chinese Taipei	566 (1.9)	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Japan	563 (2.1)	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Russian Federation	540 (4.8)	▼	▼	▼	▼						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Kazakhstan	539 (6.1)	▼	▼	▼	▼								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
England	537 (3.1)	▼	▼	▼	▼						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Latvia	537 (2.5)	▼	▼	▼	▼						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Netherlands	534 (2.4)	▼	▼	▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Germany	528 (2.5)	▼	▼	▼	▼	▼		▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Lithuania	526 (2.5)	▼	▼	▼	▼	▼		▼	▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Denmark	524 (2.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
United States	523 (2.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Sweden	519 (2.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Australia	516 (3.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Italy	509 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																	
Hungary	509 (3.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																
Austria	506 (2.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼															
Slovenia	505 (2.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼														
New Zealand	503 (2.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼														
Slovak Republic	499 (4.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼													
Scotland	497 (2.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼												
Czech Republic	493 (3.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼											
Armenia	489 (4.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼										
Norway	489 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼									
Ukraine	474 (3.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼								
Georgia	437 (4.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							
Iran, Islamic Rep. of	410 (3.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼						
Algeria	387 (4.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼					
Colombia	372 (4.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼				
El Salvador	356 (4.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼			
Morocco	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Tunisia	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Kuwait	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Qatar	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Yemen	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<b>Benchmarking Participants</b>																														
Massachusetts, US	565 (3.2)	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Minnesota, US	543 (5.1)	▼	▼	▼	▼						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Ontario, Canada	526 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Quebec, Canada	523 (3.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Alberta, Canada	519 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
British Columbia, Canada	516 (2.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼													
Dubai, UAE	446 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Note: 5% of these comparisons would be statistically significant by chance alone. A plus (+) sign indicates average achievement could not be accurately estimated.

Exhibit B.6 Multiple Comparisons of Average Achievement in Reasoning (Continued)

TIMSS2007 Mathematics 4<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Colombia	El Salvador	Morocco	Tunisia	Kuwait	Qatar	Yemen	Benchmarking Participants							Average Scale Score	Country
							Massachusetts, US	Minnesota, US	Ontario, Canada	Quebec, Canada	Alberta, Canada	British Columbia, Canada	Dubai, UAE		
▲	▲	+	+	+	+	+	▲	▲	▲	▲	▲	▲	▲	589 (3.5)	Hong Kong SAR
▲	▲	+	+	+	+	+	▲	▲	▲	▲	▲	▲	▲	578 (3.8)	Singapore
▲	▲	+	+	+	+	+	▲	▲	▲	▲	▲	▲	▲	566 (1.9)	Chinese Taipei
▲	▲	+	+	+	+	+	▲	▲	▲	▲	▲	▲	▲	563 (2.1)	Japan
▲	▲	+	+	+	+	+	▼	▲	▲	▲	▲	▲	▲	540 (4.8)	Russian Federation
▲	▲	+	+	+	+	+	▼	▲	▲	▲	▲	▲	▲	539 (6.1)	Kazakhstan
▲	▲	+	+	+	+	+	▼	▲	▲	▲	▲	▲	▲	537 (3.1)	England
▲	▲	+	+	+	+	+	▼	▲	▲	▲	▲	▲	▲	537 (2.5)	Latvia
▲	▲	+	+	+	+	+	▼	▲	▲	▲	▲	▲	▲	534 (2.4)	Netherlands
▲	▲	+	+	+	+	+	▼	▼	▲	▲	▲	▲	▲	528 (2.5)	Germany
▲	▲	+	+	+	+	+	▼	▼	▲	▲	▲	▲	▲	526 (2.5)	Lithuania
▲	▲	+	+	+	+	+	▼	▼	▲	▲	▲	▲	▲	524 (2.1)	Denmark
▲	▲	+	+	+	+	+	▼	▼	▲	▲	▲	▲	▲	523 (2.2)	United States
▲	▲	+	+	+	+	+	▼	▼	▲	▲	▲	▲	▲	519 (2.5)	Sweden
▲	▲	+	+	+	+	+	▼	▼	▼	▲	▲	▲	▲	516 (3.4)	Australia
▲	▲	+	+	+	+	+	▼	▼	▼	▼	▲	▲	▲	509 (3.1)	Italy
▲	▲	+	+	+	+	+	▼	▼	▼	▼	▼	▲	▲	509 (3.8)	Hungary
▲	▲	+	+	+	+	+	▼	▼	▼	▼	▼	▼	▲	506 (2.1)	Austria
▲	▲	+	+	+	+	+	▼	▼	▼	▼	▼	▼	▲	505 (2.1)	Slovenia
▲	▲	+	+	+	+	+	▼	▼	▼	▼	▼	▼	▲	503 (2.8)	New Zealand
▲	▲	+	+	+	+	+	▼	▼	▼	▼	▼	▼	▲	499 (4.0)	Slovak Republic
▲	▲	+	+	+	+	+	▼	▼	▼	▼	▼	▼	▲	497 (2.2)	Scotland
▲	▲	+	+	+	+	+	▼	▼	▼	▼	▼	▼	▲	493 (3.4)	Czech Republic
▲	▲	+	+	+	+	+	▼	▼	▼	▼	▼	▼	▲	489 (4.7)	Armenia
▲	▲	+	+	+	+	+	▼	▼	▼	▼	▼	▼	▲	489 (2.7)	Norway
▲	▲	+	+	+	+	+	▼	▼	▼	▼	▼	▼	▲	474 (3.2)	Ukraine
▲	▲	+	+	+	+	+	▼	▼	▼	▼	▼	▼	▲	437 (4.2)	Georgia
▲	▲	+	+	+	+	+	▼	▼	▼	▼	▼	▼	▼	410 (3.8)	Iran, Islamic Rep. of
▲	▲	+	+	+	+	+	▼	▼	▼	▼	▼	▼	▼	387 (4.7)	Algeria
▼	▲	+	+	+	+	+	▼	▼	▼	▼	▼	▼	▼	372 (4.9)	Colombia
▼	▲	+	+	+	+	+	▼	▼	▼	▼	▼	▼	▼	356 (4.0)	El Salvador
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	Morocco
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	Tunisia
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	Kuwait
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	Qatar
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	Yemen
<b>Benchmarking Participants</b>															
▲	▲	+	+	+	+	+	▲	▲	▲	▲	▲	▲	▲	565 (3.2)	Massachusetts, US
▲	▲	+	+	+	+	+	▼	▲	▲	▲	▲	▲	▲	543 (5.1)	Minnesota, US
▲	▲	+	+	+	+	+	▼	▼	▲	▲	▲	▲	▲	526 (2.6)	Ontario, Canada
▲	▲	+	+	+	+	+	▼	▼	▲	▲	▲	▲	▲	523 (3.0)	Quebec, Canada
▲	▲	+	+	+	+	+	▼	▼	▲	▲	▲	▲	▲	519 (3.1)	Alberta, Canada
▲	▲	+	+	+	+	+	▼	▼	▲	▲	▲	▲	▲	516 (2.3)	British Columbia, Canada
▲	▲	+	+	+	+	+	▼	▼	▼	▼	▼	▼	▼	446 (2.9)	Dubai, UAE

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

▲ Average achievement significantly higher than comparison country    ▼ Average achievement significantly lower than comparison country

Exhibit B.7 Multiple Comparisons of Average Achievement in Number

TIMSS2007  
Mathematics 8<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Country	Average Scale Score	Singapore	Korea, Rep. of	Chinese Taipei	Hong Kong SAR	Japan	Hungary	Czech Republic	United States	England	Sweden	Russian Federation	Lithuania	Australia	Slovenia	Malta	Armenia	Malaysia	Scotland	Norway	Serbia	Italy	Israel	Cyprus	Ukraine	Bulgaria	Romania	Lebanon	Bosnia and Herzegovina	Thailand
Singapore	597 (3.5)		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Korea, Rep. of	583 (2.4)	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Chinese Taipei	577 (4.2)	▼				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Hong Kong SAR	567 (5.6)	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Japan	551 (2.3)	▼	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Hungary	517 (3.6)	▼	▼	▼	▼						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Czech Republic	511 (2.5)	▼	▼	▼	▼	▼									▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
United States	510 (2.7)	▼	▼	▼	▼	▼																								
England	510 (5.0)	▼	▼	▼	▼	▼									▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Sweden	507 (1.8)	▼	▼	▼	▼	▼	▼										▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Russian Federation	507 (3.8)	▼	▼	▼	▼	▼	▼										▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Lithuania	506 (2.7)	▼	▼	▼	▼	▼	▼										▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Australia	503 (3.7)	▼	▼	▼	▼	▼	▼										▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Slovenia	502 (2.3)	▼	▼	▼	▼	▼	▼	▼									▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Malta	496 (1.3)	▼	▼	▼	▼	▼	▼	▼	▼												▲	▲	▲	▲	▲	▲	▲	▲	▲	
Armenia	492 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Malaysia	491 (5.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																			
Scotland	489 (3.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																		
Norway	488 (2.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																	
Serbia	478 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																
Italy	478 (2.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼								▲	▲	▲	▲	▲	▲	▲	
Israel	469 (3.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼														
Cyprus	464 (1.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼													
Ukraine	460 (3.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼												
Bulgaria	458 (4.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼											
Romania	457 (3.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼										
Lebanon	454 (3.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼									
Bosnia and Herzegovina	451 (3.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼								
Thailand	444 (4.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							
Turkey	429 (4.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼						
Tunisia	425 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼					
Georgia	421 (5.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Jordan	416 (4.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Algeria	403 (1.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Indonesia	399 (3.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Iran, Islamic Rep. of	395 (3.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Syrian Arab Republic	393 (3.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Egypt	393 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Morocco	389 (3.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Bahrain	388 (2.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Colombia	369 (3.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Botswana	366 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Palestinian Nat'l Auth.	366 (3.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Oman	363 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
El Salvador	355 (3.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Kuwait	347 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Qatar	334 (1.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Ghana	310 (3.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Saudi Arabia	309 (3.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
<b>Benchmarking Participants</b>																														
Massachusetts, US	548 (5.2)	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Minnesota, US	537 (4.3)	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Quebec, Canada	534 (3.4)	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Ontario, Canada	525 (4.0)	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
British Columbia, Canada	520 (3.2)	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Basque Country, Spain	509 (2.9)	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Dubai, UAE	458 (3.2)	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Note: 5% of these comparisons would be statistically significant by chance alone.

Exhibit B.7 Multiple Comparisons of Average Achievement in Number (Continued)

TIMSS2007  
Mathematics 8<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

	Turkey	Tunisia	Georgia	Jordan	Algeria	Indonesia	Iran, Islamic Rep. of	Syrian Arab Republic	Egypt	Morocco	Bahrain	Colombia	Botswana	Palestinian Nat'l Auth.	Oman	El Salvador	Kuwait	Qatar	Ghana	Saudi Arabia	Benchmarking Participants	Average Scale Score	Country	
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	597 (3.5)	Singapore
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	583 (2.4)	Korea, Rep. of
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	577 (4.2)	Chinese Taipei
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	567 (5.6)	Hong Kong SAR
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	551 (2.3)	Japan
	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	517 (3.6)	Hungary
	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	511 (2.5)	Czech Republic
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	510 (2.7)	United States
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	510 (5.0)	England
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	507 (1.8)	Sweden
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	507 (3.8)	Russian Federation
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	506 (2.7)	Lithuania
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	503 (3.7)	Australia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	502 (2.3)	Slovenia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	496 (1.3)	Malta
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	492 (3.1)	Armenia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	491 (5.1)	Malaysia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	489 (3.7)	Scotland
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	488 (2.0)	Norway
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	478 (2.9)	Serbia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	478 (2.8)	Italy
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	469 (3.2)	Israel
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	464 (1.6)	Cyprus
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	460 (3.7)	Ukraine
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	458 (4.7)	Bulgaria
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	457 (3.5)	Romania
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	454 (3.4)	Lebanon
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	451 (3.0)	Bosnia and Herzegovina
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	444 (4.8)	Thailand
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	429 (4.0)	Turkey
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	425 (2.6)	Tunisia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	421 (5.6)	Georgia
	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	416 (4.3)	Jordan
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	403 (1.7)	Algeria
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	399 (3.7)	Indonesia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	395 (3.9)	Iran, Islamic Rep. of
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	393 (3.4)	Syrian Arab Republic
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	393 (3.1)	Egypt
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	389 (3.4)	Morocco
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	388 (2.0)	Bahrain
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	369 (3.5)	Colombia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	366 (2.9)	Botswana
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	366 (3.2)	Palestinian Nat'l Auth.
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	363 (2.7)	Oman
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	355 (3.0)	El Salvador
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	347 (3.1)	Kuwait
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	334 (1.6)	Qatar
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	310 (3.9)	Ghana
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	309 (3.3)	Saudi Arabia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	548 (5.2)	Massachusetts, US
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	537 (4.3)	Minnesota, US
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	534 (3.4)	Quebec, Canada
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	525 (4.0)	Ontario, Canada
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	520 (3.2)	British Columbia, Canada
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	509 (2.9)	Basque Country, Spain
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	458 (3.2)	Dubai, UAE

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

▶ Average achievement significantly higher than comparison country ◀ Average achievement significantly lower than comparison country

Exhibit B.8 Multiple Comparisons of Average Achievement in Algebra

TIMSS2007  
Mathematics 8<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Country	Average Scale Score	Chinese Taipei	Korea, Rep. of	Singapore	Hong Kong SAR	Japan	Armenia	Russian Federation	Hungary	United States	Serbia	England	Slovenia	Czech Republic	Lithuania	Romania	Bulgaria	Bosnia and Herzegovina	Malta	Australia	Israel	Cyprus	Scotland	Lebanon	Ukraine	Italy	Sweden	Malaysia	Jordan	Turkey
Chinese Taipei	617 (5.4)		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Korea, Rep. of	596 (3.0)	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Singapore	579 (3.7)	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Hong Kong SAR	565 (5.6)	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Japan	559 (2.5)	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Armenia	532 (2.5)	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Russian Federation	518 (4.5)	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Hungary	503 (3.6)	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
United States	501 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Serbia	500 (3.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
England	492 (4.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Slovenia	488 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Czech Republic	484 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Lithuania	483 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Romania	478 (4.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Bulgaria	476 (5.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Bosnia and Herzegovina	475 (3.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Malta	473 (1.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	
Australia	471 (3.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	
Israel	470 (3.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	
Cyprus	468 (2.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	
Scotland	467 (3.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	
Lebanon	465 (3.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	
Ukraine	464 (3.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	
Italy	460 (3.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	
Sweden	456 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	
Malaysia	454 (4.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Jordan	448 (4.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Turkey	440 (5.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Thailand	433 (5.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Norway	425 (2.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Tunisia	423 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Georgia	421 (6.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Egypt	409 (3.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Iran, Islamic Rep. of	408 (3.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Syrian Arab Republic	406 (3.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Indonesia	405 (3.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Bahrain	403 (1.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Botswana	394 (2.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Oman	391 (3.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Colombia	390 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Palestinian Nat'l Auth.	382 (3.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Morocco	362 (4.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Ghana	358 (3.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Kuwait	354 (3.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Algeria	349 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Saudi Arabia	344 (2.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
El Salvador	331 (3.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
Qatar	312 (1.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	
<b>Benchmarking Participants</b>																														
Massachusetts, US	538 (4.8)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Minnesota, US	515 (4.7)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Quebec, Canada	505 (3.3)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Ontario, Canada	490 (3.7)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
British Columbia, Canada	489 (3.1)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Basque Country, Spain	485 (3.1)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Dubai, UAE	475 (2.4)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Note: 5% of these comparisons would be statistically significant by chance alone.



Exhibit B.8 Multiple Comparisons of Average Achievement in Algebra (Continued)

TIMSS2007 Mathematics 8<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Thailand	Norway	Tunisia	Georgia	Egypt	Iran, Islamic Rep. of	Syrian Arab Republic	Indonesia	Bahrain	Botswana	Oman	Colombia	Palestinian Nat'l Auth.	Morocco	Ghana	Kuwait	Algeria	Saudi Arabia	El Salvador	Qatar	Benchmarking Participants	Average Scale Score	Country		
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	617 (5.4)	Chinese Taipei	
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	596 (3.0)	Korea, Rep. of
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	579 (3.7)	Singapore
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	565 (5.6)	Hong Kong SAR
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	559 (2.5)	Japan
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	532 (2.5)	Armenia
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	518 (4.5)	Russian Federation
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	503 (3.6)	Hungary
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	501 (2.7)	United States
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	500 (3.2)	Serbia
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	492 (4.6)	England
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	488 (2.4)	Slovenia
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	484 (2.4)	Czech Republic
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	483 (2.7)	Lithuania
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	478 (4.6)	Romania
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	476 (5.1)	Bulgaria
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	475 (3.2)	Bosnia and Herzegovina
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	473 (1.4)	Malta
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	471 (3.7)	Australia
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	470 (3.9)	Israel
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	468 (2.0)	Cyprus
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	467 (3.7)	Scotland
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	465 (3.2)	Lebanon
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	464 (3.9)	Ukraine
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	460 (3.2)	Italy
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	456 (2.4)	Sweden
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	454 (4.3)	Malaysia
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	448 (4.1)	Jordan
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	440 (5.1)	Turkey
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	433 (5.0)	Thailand
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	425 (2.8)	Norway
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	423 (2.6)	Tunisia
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	421 (6.6)	Georgia
▼	▼	▼	▼	▼	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	409 (3.3)	Egypt
▼	▼	▼	▼	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	408 (3.9)	Iran, Islamic Rep. of
▼	▼	▼	▼	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	406 (3.7)	Syrian Arab Republic
▼	▼	▼	▼	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	405 (3.5)	Indonesia
▼	▼	▼	▼	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	403 (1.8)	Bahrain
▼	▼	▼	▼	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	394 (2.2)	Botswana
▼	▼	▼	▼	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	391 (3.2)	Oman
▼	▼	▼	▼	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	390 (3.1)	Colombia
▼	▼	▼	▼	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	382 (3.4)	Palestinian Nat'l Auth.
▼	▼	▼	▼	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	362 (4.0)	Morocco
▼	▼	▼	▼	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	358 (3.6)	Ghana
▼	▼	▼	▼	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	354 (3.0)	Kuwait
▼	▼	▼	▼	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	349 (2.4)	Algeria
▼	▼	▼	▼	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	344 (2.8)	Saudi Arabia
▼	▼	▼	▼	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	331 (3.7)	El Salvador
▼	▼	▼	▼	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	312 (1.5)	Qatar
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	538 (4.8)	Massachusetts, US
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	515 (4.7)	Minnesota, US
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	505 (3.3)	Quebec, Canada
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	490 (3.7)	Ontario, Canada
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	489 (3.1)	British Columbia, Canada
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	485 (3.1)	Basque Country, Spain
▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	475 (2.4)	Dubai, UAE

▶ Average achievement significantly higher than comparison country    ▼ Average achievement significantly lower than comparison country

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Exhibit B.9 Multiple Comparisons of Average Achievement in Geometry

TIMSS2007  
Mathematics 8<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Country	Average Scale Score	Chinese Taipei	Korea, Rep. of	Singapore	Japan	Hong Kong SAR	England	Russian Federation	Hungary	Lithuania	Slovenia	Czech Republic	Malta	Armenia	Italy	Australia	Serbia	Scotland	United States	Malaysia	Sweden	Bulgaria	Ukraine	Romania	Lebanon	Norway	Cyprus	Bosnia and Herzegovina	Thailand	Tunisia
Chinese Taipei	592 (4.6)			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Korea, Rep. of	587 (2.3)			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Singapore	578 (3.4)	▼	▼				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Japan	573 (2.2)	▼	▼				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hong Kong SAR	570 (5.5)	▼	▼				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
England	510 (4.4)	▼	▼	▼	▼	▼					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Russian Federation	510 (4.1)	▼	▼	▼	▼	▼					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hungary	508 (3.6)	▼	▼	▼	▼	▼					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Lithuania	507 (2.6)	▼	▼	▼	▼	▼					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Slovenia	499 (2.4)	▼	▼	▼	▼	▼	▼	▼		▼						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Czech Republic	498 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Malta	495 (1.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Armenia	493 (4.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Italy	490 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Australia	487 (3.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Serbia	486 (3.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Scotland	485 (3.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
United States	480 (2.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Malaysia	477 (5.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Sweden	472 (2.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Bulgaria	468 (5.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ukraine	467 (3.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Romania	466 (4.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Lebanon	462 (4.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Norway	459 (2.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Cyprus	458 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Bosnia and Herzegovina	451 (3.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Thailand	442 (5.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Tunisia	437 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Israel	436 (4.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Jordan	436 (3.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Algeria	432 (2.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Iran, Islamic Rep. of	423 (4.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Syrian Arab Republic	417 (3.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Bahrain	412 (2.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Turkey	411 (5.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Georgia	409 (6.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Egypt	406 (3.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Morocco	396 (3.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Indonesia	395 (4.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Palestinian Nat'l Auth.	388 (3.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Oman	387 (3.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Kuwait	385 (2.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Colombia	371 (3.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Saudi Arabia	359 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Botswana	325 (3.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
El Salvador	318 (3.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Qatar	301 (1.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ghana	275 (4.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
<b>Benchmarking Participants</b>																														
Quebec, Canada	523 (3.3)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Massachusetts, US	519 (4.3)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ontario, Canada	508 (4.2)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Minnesota, US	505 (4.4)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
British Columbia, Canada	487 (3.7)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Basque Country, Spain	476 (3.7)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Dubai, UAE	451 (3.4)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Note: 5% of these comparisons would be statistically significant by chance alone.

Exhibit B.9 Multiple Comparisons of Average Achievement in Geometry (Continued)

TIMSS2007 Mathematics 8<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Country	Israel	Jordan	Algeria	Iran, Islamic Rep. of	Syrian Arab Republic	Bahrain	Turkey	Georgia	Egypt	Morocco	Indonesia	Palestinian Nat'l Auth.	Oman	Kuwait	Colombia	Saudi Arabia	Botswana	El Salvador	Qatar	Ghana	Benchmarking Participants	Average Scale Score	Country	
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	592 (4.6)	Chinese Taipei
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	587 (2.3)	Korea, Rep. of
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	578 (3.4)	Singapore
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	573 (2.2)	Japan
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	570 (5.5)	Hong Kong SAR
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	510 (4.4)	England
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	510 (4.1)	Russian Federation
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	508 (3.6)	Hungary
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	507 (2.6)	Lithuania
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	499 (2.4)	Slovenia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	498 (2.7)	Czech Republic
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	495 (1.1)	Malta
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	493 (4.1)	Armenia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	490 (3.1)	Italy
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	487 (3.6)	Australia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	486 (3.6)	Serbia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	485 (3.9)	Scotland
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	480 (2.5)	United States
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	477 (5.6)	Malaysia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	472 (2.5)	Sweden
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	468 (5.0)	Bulgaria
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	467 (3.6)	Ukraine
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	466 (4.0)	Romania
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	462 (4.0)	Lebanon
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	459 (2.3)	Norway
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	458 (2.7)	Cyprus
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	451 (3.5)	Bosnia and Herzegovina
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	442 (5.3)	Thailand
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	437 (2.6)	Tunisia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	436 (4.3)	Israel
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	436 (3.9)	Jordan
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	432 (2.1)	Algeria
	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	423 (4.4)	Iran, Islamic Rep. of
	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	417 (3.4)	Syrian Arab Republic
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	412 (2.1)	Bahrain
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	411 (5.1)	Turkey
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	409 (6.7)	Georgia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	406 (3.4)	Egypt
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	396 (3.6)	Morocco
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	395 (4.5)	Indonesia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	388 (3.8)	Palestinian Nat'l Auth.
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	387 (3.0)	Oman
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	385 (2.8)	Kuwait
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	371 (3.3)	Colombia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	359 (2.6)	Saudi Arabia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	325 (3.2)	Botswana
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	318 (3.7)	El Salvador
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	301 (1.8)	Qatar
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	◀	275 (4.9)	Ghana
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	523 (3.3)	Quebec, Canada
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	519 (4.3)	Massachusetts, US
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	508 (4.2)	Ontario, Canada
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	505 (4.4)	Minnesota, US
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	487 (3.7)	British Columbia, Canada
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	476 (3.7)	Basque Country, Spain
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	451 (3.4)	Dubai, UAE

▶ Average achievement significantly higher than comparison country ◀ Average achievement significantly lower than comparison country

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Exhibit B.10 Multiple Comparisons of Average Achievement in Data and Chance

TIMSS2007  
Mathematics 8<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Country	Average Scale Score	Korea, Rep. of	Singapore	Japan	Chinese Taipei	Hong Kong SAR	England	United States	Sweden	Australia	Hungary	Lithuania	Scotland	Czech Republic	Slovenia	Norway	Italy	Russian Federation	Malta	Malaysia	Israel	Cyprus	Serbia	Ukraine	Thailand	Turkey	Bulgaria	Bosnia and Herzegovina	Romania	Armenia
Korea, Rep. of	580 (2.0)			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Singapore	574 (3.9)				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Japan	573 (2.2)	▼				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Chinese Taipei	566 (3.6)					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hong Kong SAR	549 (4.7)	▼	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
England	547 (5.0)	▼	▼	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
United States	531 (2.8)	▼	▼	▼	▼	▼						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Sweden	526 (3.0)	▼	▼	▼	▼	▼	▼						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Australia	525 (3.2)	▼	▼	▼	▼	▼	▼						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hungary	524 (3.3)	▼	▼	▼	▼	▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Lithuania	523 (2.3)	▼	▼	▼	▼	▼	▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Scotland	517 (3.5)	▼	▼	▼	▼	▼	▼	▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Czech Republic	512 (2.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Slovenia	511 (2.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Norway	505 (2.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Italy	491 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Russian Federation	487 (3.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Malta	487 (1.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Malaysia	469 (4.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼						▲	▲	▲	▲	▲	▲	▲	▲	▲
Israel	465 (4.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼						▲	▲	▲	▲	▲	▲	▲	▲
Cyprus	464 (1.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							▲	▲	▲	▲	▲	▲
Serbia	458 (3.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							▲	▲	▲	▲	▲
Ukraine	458 (3.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							▲	▲	▲	▲
Thailand	453 (4.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							▲	▲	▲
Turkey	445 (4.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							▲	▲
Bulgaria	440 (4.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼						▲	▲
Bosnia and Herzegovina	437 (2.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Romania	429 (3.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Armenia	427 (3.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Jordan	425 (3.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Bahrain	418 (2.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Iran, Islamic Rep. of	415 (3.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Tunisia	411 (2.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Lebanon	407 (4.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Colombia	405 (3.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Indonesia	402 (3.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Oman	389 (3.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Syrian Arab Republic	387 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Egypt	384 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Botswana	384 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Georgia	373 (4.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Algeria	371 (1.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Morocco	371 (3.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Palestinian Nat'l Auth.	371 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Kuwait	366 (3.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
El Salvador	362 (3.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Saudi Arabia	348 (2.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Ghana	321 (3.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Qatar	305 (1.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
<b>Benchmarking Participants</b>																														
Massachusetts, US	569 (5.2)	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Minnesota, US	560 (5.4)	▼	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ontario, Canada	543 (4.2)	▼	▼	▼	▼		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Quebec, Canada	533 (3.0)	▼	▼	▼	▼	▼						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
British Columbia, Canada	529 (3.2)	▼	▼	▼	▼	▼	▼						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Basque Country, Spain	504 (3.7)	▼	▼	▼	▼	▼	▼	▼																						
Dubai, UAE	457 (3.2)	▼	▼	▼	▼	▼	▼	▼	▼																					

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Note: 5% of these comparisons would be statistically significant by chance alone.

Exhibit B.10 Multiple Comparisons of Average Achievement in Data and Chance (Continued)

TIMSS2007 Mathematics 8<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Country	Jordan	Bahrain	Iran, Islamic Rep. of	Tunisia	Lebanon	Colombia	Indonesia	Oman	Syrian Arab Republic	Egypt	Botswana	Georgia	Algeria	Morocco	Palestinian Nat'l Auth.	Kuwait	El Salvador	Saudi Arabia	Ghana	Qatar	Benchmarking Participants	Average Scale Score	Country	
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	Massachusetts, US	580 (2.0)	Korea, Rep. of
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	Minnesota, US	574 (3.9)	Singapore
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	Ontario, Canada	573 (2.2)	Japan
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	Quebec, Canada	566 (3.6)	Chinese Taipei
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	British Columbia, Canada	549 (4.7)	Hong Kong SAR
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	Basque Country, Spain	547 (5.0)	England
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	Dubai, UAE	531 (2.8)	United States
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		526 (3.0)	Sweden
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		525 (3.2)	Australia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		524 (3.3)	Hungary
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		523 (2.3)	Lithuania
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		517 (3.5)	Scotland
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		512 (2.8)	Czech Republic
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		511 (2.3)	Slovenia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		505 (2.5)	Norway
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		491 (3.1)	Italy
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		487 (3.8)	Russian Federation
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		487 (1.4)	Malta
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		469 (4.1)	Malaysia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		465 (4.4)	Israel
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		464 (1.6)	Cyprus
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		458 (3.0)	Serbia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		458 (3.5)	Ukraine
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		453 (4.1)	Thailand
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		445 (4.4)	Turkey
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		440 (4.7)	Bulgaria
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		437 (2.3)	Bosnia and Herzegovina
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		429 (3.7)	Romania
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		427 (3.9)	Armenia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		425 (3.8)	Jordan
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		418 (2.1)	Bahrain
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		415 (3.5)	Iran, Islamic Rep. of
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		411 (2.3)	Tunisia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		407 (4.4)	Lebanon
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		405 (3.8)	Colombia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		402 (3.6)	Indonesia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		389 (3.0)	Oman
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		387 (2.7)	Syrian Arab Republic
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	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		384 (2.6)	Botswana
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		373 (4.3)	Georgia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		371 (1.7)	Algeria
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		371 (3.4)	Morocco
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		371 (2.9)	Palestinian Nat'l Auth.
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		366 (3.5)	Kuwait
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		362 (3.0)	El Salvador
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		348 (2.2)	Saudi Arabia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		321 (3.6)	Ghana
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		305 (1.6)	Qatar
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		569 (5.2)	Massachusetts, US
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		560 (5.4)	Minnesota, US
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		543 (4.2)	Ontario, Canada
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		533 (3.0)	Quebec, Canada
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		529 (3.2)	British Columbia, Canada
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		504 (3.7)	Basque Country, Spain
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		457 (3.2)	Dubai, UAE

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

▶ Average achievement significantly higher than comparison country    ◀ Average achievement significantly lower than comparison country

Exhibit B.11 Multiple Comparisons of Average Achievement in Knowing

TIMSS2007  
Mathematics 8<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Country	Average Scale Score	Korea, Rep. of	Chinese Taipei	Singapore	Hong Kong SAR	Japan	Russian Federation	Hungary	United States	Lithuania	Armenia	England	Czech Republic	Serbia	Slovenia	Malta	Australia	Scotland	Sweden	Bosnia and Herzegovina	Bulgaria	Malaysia	Italy	Israel	Ukraine	Romania	Cyprus	Lebanon	Norway	Turkey
Korea, Rep. of	596 (2.5)		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Chinese Taipei	594 (4.5)			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Singapore	581 (3.4)	▼	▼																											
Hong Kong SAR	574 (5.4)	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Japan	560 (2.2)	▼	▼	▼																										
Russian Federation	521 (3.9)	▼	▼	▼	▼																									
Hungary	518 (3.3)	▼	▼	▼	▼																									
United States	514 (2.6)	▼	▼	▼	▼	▼																								
Lithuania	508 (2.5)	▼	▼	▼	▼	▼	▼																							
Armenia	507 (3.1)	▼	▼	▼	▼	▼	▼	▼																						
England	503 (4.0)	▼	▼	▼	▼	▼	▼	▼	▼																					
Czech Republic	502 (2.5)	▼	▼	▼	▼	▼	▼	▼	▼																					
Serbia	500 (3.2)	▼	▼	▼	▼	▼	▼	▼	▼																					
Slovenia	500 (2.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Malta	490 (1.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																			
Australia	487 (3.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																		
Scotland	481 (3.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																	
Sweden	478 (2.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																
Bosnia and Herzegovina	478 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼															
Bulgaria	477 (4.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼														
Malaysia	477 (4.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼														
Italy	476 (3.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼													
Israel	473 (3.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼													
Ukraine	471 (3.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼													
Romania	470 (4.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼													
Cyprus	468 (1.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼												
Lebanon	464 (3.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼											
Norway	458 (1.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼										
Turkey	439 (4.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼									
Thailand	436 (4.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼									
Jordan	432 (4.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼								
Georgia	427 (5.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼								
Tunisia	421 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							
Iran, Islamic Rep. of	403 (4.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							
Indonesia	397 (4.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼						
Bahrain	395 (1.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼						
Syrian Arab Republic	393 (4.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼						
Egypt	392 (3.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼					
Botswana	376 (2.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼					
Oman	372 (3.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼					
Algeria	371 (1.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼					
Palestinian Nat'l Auth.	365 (3.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼					
Morocco	365 (4.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼					
Colombia	364 (3.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼					
Kuwait	347 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼					
El Salvador	336 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼					
Ghana	313 (4.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼					
Saudi Arabia	308 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼					
Qatar	307 (1.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼					
<b>Benchmarking Participants</b>																														
Massachusetts, US	546 (4.5)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Minnesota, US	532 (4.6)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Quebec, Canada	520 (2.7)	▼	▼	▼	▼	▼																								
Ontario, Canada	505 (3.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
British Columbia, Canada	504 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Basque Country, Spain	501 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Dubai, UAE	469 (2.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Note: 5% of these comparisons would be statistically significant by chance alone.



Exhibit B.12 Multiple Comparisons of Average Achievement in Applying

TIMSS2007  
Mathematics 8<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Country	Average Scale Score	Comparison Countries																													
		Korea, Rep. of	Singapore	Chinese Taipei	Hong Kong SAR	Japan	England	Hungary	Lithuania	Russian Federation	Czech Republic	Slovenia	United States	Australia	Sweden	Armenia	Malta	Scotland	Italy	Serbia	Malaysia	Norway	Cyprus	Ukraine	Romania	Bulgaria	Israel	Lebanon	Thailand	Bosnia and Herzegovina	
Korea, Rep. of	595 (2.8)				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Singapore	593 (3.6)				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Chinese Taipei	592 (4.2)				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hong Kong SAR	569 (5.9)	▼	▼	▼																											
Japan	565 (2.2)	▼	▼	▼																											
England	514 (4.9)	▼	▼	▼	▼																										
Hungary	513 (3.1)	▼	▼	▼	▼	▼																									
Lithuania	511 (2.4)	▼	▼	▼	▼	▼																									
Russian Federation	510 (3.7)	▼	▼	▼	▼	▼																									
Czech Republic	504 (2.7)	▼	▼	▼	▼	▼	▼																								
Slovenia	503 (2.0)	▼	▼	▼	▼	▼	▼	▼																							
United States	503 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼																						
Australia	500 (3.4)	▼	▼	▼	▼	▼	▼	▼	▼																						
Sweden	497 (2.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼																					
Armenia	493 (3.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																				
Malta	492 (1.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																			
Scotland	489 (3.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																		
Italy	483 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																	
Serbia	478 (3.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼																
Malaysia	478 (4.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼															
Norway	477 (2.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼														
Cyprus	465 (1.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼													
Ukraine	464 (3.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼												
Romania	462 (4.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼											
Bulgaria	458 (4.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼										
Israel	456 (4.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼									
Lebanon	448 (4.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼								
Thailand	446 (4.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							
Bosnia and Herzegovina	440 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼						
Turkey	425 (4.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼				
Tunisia	423 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼			
Jordan	422 (4.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼			
Algeria	412 (2.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Bahrain	403 (1.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Iran, Islamic Rep. of	402 (4.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Georgia	401 (5.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Syrian Arab Republic	401 (3.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Indonesia	398 (3.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Egypt	393 (3.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Morocco	389 (3.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Colombia	384 (3.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Palestinian Nat'l Auth.	371 (3.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Oman	368 (3.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Kuwait	361 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Botswana	351 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
El Salvador	347 (3.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Saudi Arabia	335 (2.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Qatar	305 (1.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Ghana	297 (4.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
<b>Benchmarking Participants</b>																															
Massachusetts, US	542 (4.4)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Minnesota, US	530 (4.8)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Quebec, Canada	529 (3.1)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Ontario, Canada	518 (3.7)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
British Columbia, Canada	509 (3.1)	▼	▼	▼	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Basque Country, Spain	495 (3.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	
Dubai, UAE	456 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Note: 5% of these comparisons would be statistically significant by chance alone.



Exhibit B.12 Multiple Comparisons of Average Achievement in Applying (Continued)

TIMSS2007  
Mathematics 8<sup>th</sup> Grade

Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

Country	Turkey	Tunisia	Jordan	Algeria	Bahrain	Iran, Islamic Rep. of	Georgia	Syrian Arab Republic	Indonesia	Egypt	Morocco	Colombia	Palestinian Nat'l Auth.	Oman	Kuwait	Botswana	El Salvador	Saudi Arabia	Qatar	Ghana	Benchmarking Participants	Average Scale Score	Country	
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	Massachusetts, US	595 (2.8)	Korea, Rep. of
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	Minnesota, US	593 (3.6)	Singapore
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	Quebec, Canada	592 (4.2)	Chinese Taipei
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	Ontario, Canada	569 (5.9)	Hong Kong SAR
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	British Columbia, Canada	565 (2.2)	Japan
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	Basque Country, Spain	514 (4.9)	England
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	Dubai, UAE	513 (3.1)	Hungary
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		511 (2.4)	Lithuania
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		510 (3.7)	Russian Federation
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		504 (2.7)	Czech Republic
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		503 (2.0)	Slovenia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		503 (2.9)	United States
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		500 (3.4)	Australia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		497 (2.0)	Sweden
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		493 (3.8)	Armenia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		492 (1.0)	Malta
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		489 (3.7)	Scotland
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		483 (2.9)	Italy
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		478 (3.3)	Serbia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		478 (4.9)	Malaysia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		477 (2.2)	Norway
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		465 (1.8)	Cyprus
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		464 (3.5)	Ukraine
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		462 (4.0)	Romania
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		458 (4.8)	Bulgaria
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		456 (4.1)	Israel
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		448 (4.6)	Lebanon
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		446 (4.7)	Thailand
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		440 (2.6)	Bosnia and Herzegovina
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		425 (4.5)	Turkey
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		423 (2.4)	Tunisia
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		422 (4.1)	Jordan
	◀	◀	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		412 (2.0)	Algeria
	◀	◀	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		403 (1.9)	Bahrain
	◀	◀	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		402 (4.2)	Iran, Islamic Rep. of
	◀	◀	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		401 (5.5)	Georgia
	◀	◀	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		401 (3.4)	Syrian Arab Republic
	◀	◀	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		398 (3.7)	Indonesia
	◀	◀	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		393 (3.6)	Egypt
	◀	◀	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		389 (3.3)	Morocco
	◀	◀	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		384 (3.7)	Colombia
	◀	◀	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		371 (3.4)	Palestinian Nat'l Auth.
	◀	◀	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		368 (3.0)	Oman
	◀	◀	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		361 (2.7)	Kuwait
	◀	◀	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		351 (2.6)	Botswana
	◀	◀	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		347 (3.3)	El Salvador
	◀	◀	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		335 (2.3)	Saudi Arabia
	◀	◀	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		305 (1.4)	Qatar
	◀	◀	◀	◀	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		297 (4.2)	Ghana
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	Benchmarking Participants		
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		542 (4.4)	Massachusetts, US
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		530 (4.8)	Minnesota, US
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		529 (3.1)	Quebec, Canada
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		518 (3.7)	Ontario, Canada
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		509 (3.1)	British Columbia, Canada
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		495 (3.0)	Basque Country, Spain
	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶	▶		456 (2.9)	Dubai, UAE

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

▶ Average achievement significantly higher than comparison country ◀ Average achievement significantly lower than comparison country





