



MetriKsAmérique

Psychometric Performance Report

Prepared for:



Spatial Reasoning Assessment

January 2021

Table of Contents

Initial Remarks	3
Test Specifications	4
Subject Matter Experts	5
Item Development/Construction	5
Content Domain/Representation	8
Removing Construct Irrelevant Invariance	8
PreTest Items	9
Cut Score Discussed	9
Documentation of Scoring Process Used	10
Reporting	11
Exam Methodology and Process	11
Quality Control Procedures	12
Technical Information	13
Reliability	14
Decision Consistency	15
Exam Statistics for Candidates	16
Recommendations	16
Maps and Statistics	17

Initial Remarks

A full statistical analysis of the reported examinations is included in this report. The following observations and recommendations are made to improve the examination and process.

✓	None noted
	Recommendations
	Observations

Test Specifications

Purpose for the Examination

The purpose of the examination is to spatial (GIS) reasoning within a secondary school setting. Passage of this examination does not carry consequences and thus is considered low-stakes.

Intended Population

The intended population includes high school students who have participated in coursework and instruction relative to spatial reasoning vis-à-vis GIS.

Intended Use of Scores and Score Interpretation

The assessments currently under investigation are experimental and are not currently used for interpretation beyond the study purposes.

Description of Table of Specifications (Test Characteristics)

While there is no Table of Specifications associated with this assessment, the assessment was developed as an extension of a previously developed exam offered by another group, covering similar topics.

Validity Evidence to Support the Table of Specifications

While validity evidence is included in this report, it is general. The current evaluation is experimental within the process of examination development.

Plan to Update

There are no current plans to update the Task Analysis, or develop a Table of Specifications, by this researcher.

Subject Matter Experts

Education and Training

Dr. Katherine James is a Research Assistant Professor of Learning Sciences at Northwestern University. She received her Ph.D. in 2017 from University of Illinois at Chicago. She has prior experience with assessment design and GIS-infused instruction.

Jose Sotelo is a Ph.D. student in Psychology at Northwestern University.

Item Development/Construction

Description of Item Types

All items were considered to be open-ended, constructed response, and were scored via judge evaluators.

Writing and Review of Items Described in Detail

We developed three parallel versions of the assessment for three different content areas: Social Science, Law, and Architecture. Each assessment draws on local data and real initiatives currently taking place in Chicago. Each assessment has five questions: two questions in the relevant content area, the same two questions in a different content area, and one question from the original Geospatial Semester assessments. The first two questions are different for each content area and the other three are identical across all content areas. The first two questions assess students' ability to reason about maps and data, use that information to identify the best location for a new site, and explain why that is the best location. The remaining questions present a problem that could be solved using either a spatial/GIS or non-spatial/GIS approach and ask students to explain how they would solve the problem. These questions were designed to parallel the original Geospatial Semester assessments, which allows us to examine whether our assessments produce convergent results.

During Spring 2019, the assessments were pilot tested. First, we conducted an interview-based pilot test with small groups of students in each content area. The interviews were recorded and analyzed. Based on the results of the interview-based pilot test, we refined the assessment questions to address redundancies and points of confusion that were identified in our analysis. Next, we piloted the assessments in a paper and pencil format that can be used for individual administration in the classroom. Based on the results of the classroom pilot we made final tweaks to the wording of the assessment questions to make them more suitable for the classroom assessment format. During Fall 2019, we administered the refined assessments as a pre-test in the participating teachers' classrooms.

The coding rubric was developed to categorize different levels of performance on each of the two question types discussed above (best location and type of reasoning). The rubric is domain general and is used across all content areas. For the best location questions, the rubric focuses on whether students are able to identify spatial patterns and relationships on the provided maps. The coding awards a higher score if they not only identify patterns on the maps but also explain why those patterns exist. Additionally, the rubric distinguishes whether students can use the map to identify a best new location for a context dependent idea (e.g. a new free pre-k). To better understand the motivation behind their choice, the rubric also evaluates evidence and reasoning, as described by McNeill and Krajcik (2011).

For the second question, type of reasoning, the rubric focuses on identifying if the student can use the data and map that was given to solve a problem (e.g. As an election monitor in Cook County, how would you go about identifying polling places to visit on election day?). The rubric identifies whether students can identify factors that were relevant to the problem (e.g. population) and whether students use a spatial approach when solving the problem (e.g. "I would focus on highly populated clusters in the city because..."). The rubric also evaluates whether students use a GIS-based approach to solving the problem. For the type of reasoning questions we also focus on whether the three components mentioned above (relevant factors, spatial approach, GIS approach) are used before or after students are given a map.

References and Validation of Items

To refine our coding, two independent coders met to identify areas in the coding rubric that may be ambiguous and need more description to facilitate distinguishing between levels of accuracy or sophistication. Additionally the two coders added several examples from the pilot data at each coding level and highlighted discrepancies that had arisen. The concerns and examples were discussed in weekly research team meetings, leading to an iterative process of improvement. In these larger meetings we also incorporated clarifications (e.g. concept definitions, GIS reference list, key distinctions between levels of coding) and details to the rubric. We also discussed ambiguous examples in order to find consensus on coding.

Next, two independent coders from the research team coded examples from our pilot as well as added their rationales for the codes. The two coders then met to compare codes and discuss differences. Through these conversations changes were made to the rubric to clarify any ambiguous language as well as add examples that would help future coders distinguish between codes. After this iterative process of improving the coding rubric, the rubric was brought to the weekly research meeting for further refinement and discussion.

After the research team developed consensus on the coding rubric, it was sent to The Graide Network for third party coding of the remainder of the data. The Graide Network is an independent company based in Chicago that uses a team of graders that help both K-12 teachers as well as researchers grade and code writing assignments done by students. We used two independent coders from the Graide Network and they were given our coding rubric, uncoded data from our pre assessment, as well as coded examples from our pilot data. The pre assessment data was coded in four separate chunks by the graders. After each chunk of the data was graded, three members of the research team would meet and go over the discrepancies in the code between the two coders from The Graide Network. We did this in order to further refine ambiguities in the coding rubric as well as add examples from the data from the pre assessments. This process was done a further three times and any changes to the rubric that were

made were sent to The Graide Network so that it could be used for the next chunk of the data until the entire sample was coded.

McNeill, K. L., & Krajcik, J. S. (2011). Supporting Grade 5-8 Students in Constructing Explanations in Science: The Claim, Evidence, and Reasoning Framework for Talk and Writing. *Pearson*.

Evidence that Items Link to Task Analysis

No task analysis was conducted for the purposes of creating the present assessment. No evidence will be presented on this aspect of the assessment construction.

Reliability or Consistency in Coding Items

Items are scored via a dedicated, extensive rubric. No other ratings are allowable.

Content Domain/Representation

Avoidance of Over- or Under-Representation

All items presented on the assessment relate to spatial reasoning and GIS is general. More specifically, they cover the following aspects:

- Map and Data Interpretation
- Claim (Basis, understanding)
- Evidence (Use, presentation)
- Reasoning
- Relevant Factors and Data (Use of)
- Spatial Approach (Before and After)
- GIS Approach (Before and After)
- Relevant Factors (Inclusion of)

Validity Evidence

Aspects of Construct Validity cannot be claimed because of the lack of a Table of Specifications. However, relative presentation of validity evidence is included. In addition, Fit and other statistics as presented in Table 1 support a suggestion of general validity.

Removing Construct Irrelevant Variance

Fairness Review Provided

Subject matter experts review each item for bias (gender, cultural, and other biases) at the time each item is entered into the bank. In addition, fairness is one of the conditions evaluated during the statistical review of poorly performing items after administration.

Differential Item Functioning Review

Differential Item Functioning analyses are typically conducted on the aforementioned examination(s) only when the following conditions are met:

- (1) sufficient candidates exist to make the analyses reasonable (i.e., > 100 candidates); and
- (2) there exists the presence of substantive differential attributes (e.g., gender, race) of protected classes, that would warrant the running of such analyses (i.e., at least 20% of the candidates should be of a protected class).

Because no demographic data are present no DIF analyses were conducted.

Pretest Items

Placement

	Written Examination: Pretest items are placed throughout the examination (scattered). Candidates do not know which items are pretest and which items count towards their score.
✓	Written Examination: Pretest items are not included in the current examination.

Criteria for Acceptance

When pretest items are used, they must meet all guidelines for properly written items as defined in the MetriKs Amerique Professional Item Writers Handbook. In addition, the items must match the content blueprint and not overtly exceed the percentage distribution of content across the examination.

Cut Score Discussed

Criterion or Norm Referenced

NA

Brief Description of the Process

NA

Explanation of Cut Score

NA

Evidence of Scale Stability Over Time

Evidence of scale stability over time is documented through the equating model. If the item difficulties remain relatively consistent, with few shifts, the scale may be said to have been maintained, within the margin of error. Rasch Common Item Equating is used to equate after each evaluated examination and scale maintenance is checked along with the reliability of the equated scale.

	The equated items remained stable since the previous administration.
	The equated items shifted and were unsuitable for anchoring thus limiting the equating of the scale during this administration.
✓	The current examination is new and has never been equated.

Equating of Standards

NA

Documentation of Scoring Process Used

Statistical Techniques/Computer Programs

	<p>The Rasch Model for dichotomous data was used as the primary analytic model. The <i>Winteps</i>® Computer Program was used to analyze all presented data. [Version 3.68.2]</p> <p>A secondary classical test theory analysis was employed to provide better option choice evaluation. The <i>ITEMAN</i>® Computer Program was used to analyze all presented data. [Version 3.50A]</p>
✓	<p>The Rasch Model for polytymous data was used as the primary analytic model. The <i>FACETS</i>® Computer Program was used to analyze all presented data. [Version 3.67.1]</p>

Equating Model

Rasch Common Item Equating is used to link (equate) the reported examination(s) to a previous administration. The examinations are equated to the following administration:

Examination	Equating Administration
Spatial Reasoning/GIS	Not Applicable
Remarks:	The current examination is new and therefore has not been equated to a prior exam.

Quality Control

Prior to scoring, a key validation is conducted to ensure the correct answers are used in the scoring process.

Reporting

Score Information

See Addendum A for a table of person scores.

Interpretation of Scores

Scores are presented in one of two ways, as Rasch measures or as standard scores (transformed Rasch measures, for ease of presentation).

✓	Scores on the aforementioned examination are presented as Rasch measures in logits (log-odd units). Rasch measures are interval level measures representing the ordinal raw scores in a more precise fashion. Measures are precise to the standard error of measure listed in the column to the right of the measure. The more positive the measure, the more able the candidate; the more negative the measure, the less able the candidate.
	Scores on the aforementioned examination are presented as standard scores (transformed Rasch measures) for ease of presentation, with 400 being required to pass, and a minimum reported score of 100 and maximum reported of 800. Transformed scores are simply linear conversions of Rasch measures onto a simpler scale for the purposes of reporting. Higher values indicate greater ability, while lower values indicate lower ability. The error associated with this examination in standard score points is:

Scores may be used *solely* for understanding candidates on the listed examination. They are not intended to be used for any other purpose.

Exam Methodology and Process

Selection of Theory/Model

The Rasch Model is used for evaluation of the examination reported.

Rationale

The Rasch Model was selected for its invariant properties, its ability to define a useful construct (e.g., academic content), and its ability to readily equate examinations.

Relevant Formula

The Rasch Model for polytomous data is expressed as:

$$\text{Log}_e = (P_{nijx} / P_{nij(x-1)}) = \beta n - \delta i - C_j - F_x$$

Where βn = the ability of student n;
 δi = the difficulty of item I;
 C_j = the severity of judge j; and
 F_x = the Rasch-Andrich threshold (step calibration)

References

Bond, T.G. & Fox, C.M. (2007). *Applying the Rasch Model: Fundamental measurement in the human sciences*. 2nd Ed (includes Rasch software on CD-ROM). Lawrence Erlbaum.

Wright, B.D., & Masters, G. (1982). *Rating Scale Analysis*. Chicago, IL: MESA Press.

Wright, B.D., & Stone, M.H. (1979). *Best Test Design*. Chicago, IL: MESA Press.

Quality Control Procedures

Prior to scoring, a key validation is conducted to ensure the correct answers are used in the scoring process.

Technical Information

Test and Item Level Information

Mean: The average measure for students examined.

Rasch Strata: A measure of clarity within the examination. The statistic reveals how many statistically significant, identifiable groups are measurable using the instrument. In general examinations the minimal number of strata required is 2.0. A value of 2.0 suggests that the group of examinees can be divided into at least two groups. While 2.0 represents the value minimally required for psychometric soundness, we strive for larger values (greater than 4.0). The rule of thumb regarding strata is the higher the better.

Rasch Reliability: A measure of consistency, similar to separation. Examinations must produce reliable measures in order to ensure that any outcome decisions are made appropriately. Reliability is associated with several factors, most notably the quality (discriminatory ability) of the items and the size of the sample. Items that fail to discriminate high performing students from lower performing students lower the reliability of the examination. Better items lead to improved reliability. Low student numbers generally lower estimates of reliability.

Rasch Fit: A measure of expectancy. Examinations comply with the expectations of the model when fit statistics are between 1.0 and 1.3. Fit statistics greater than 1.2 suggest that the examination is composed of items that contain too much error.

SEM: Standard error of measure (expected to be low, or in the .25-.35 range maximally).

SD: The standard deviation is a measure of precision. Greater deviation scores indicate the examination is able to distinguish between a greater number of candidates of differing abilities.

Table 1 presents Quality Statistics for each examination

Table 1: Quality Indictors of the Reported Written Examination(s)

	N	Mean	Strata	Reliability	Mean Fit	SEM	SD
Spatial Reasoning/GIS	316	-3.67	4.36	.90	1.01	.33	1.11
Mean = Mean Rasch Difficulty		Strata = Rasch Strata Statistic			Reliability = Rasch Reliability		
Mean Fit = Rasch Fit Statistic		SEM = Standard Error of Measure			SD = Standard Deviation		
Remarks:	Final statistics presented are taken from the assessment without the Item 5 series.						

Targeting (Quantity)

Targeting: Items that are essentially too easy or too difficult do not help the measurement process because they fail to function in their role of discriminating passing from failing candidates. Items serve two roles – to assess content and discriminate among candidates who have mastered the content from those who have not. Targeting assists in the latter role.

Table 2 presents information on the effective targeting of the reported examinations.

Table 2: Targeting Assessment of the Reported Written Examination(s)

Examination	Items Too Easy	Items Too Difficult	Items On-Target
Spatial Reasoning/GIS	0	4*	16
Remarks:	Targeting conducted on assessment after the removal of item series 5. The four items which were determined to be too difficult all belonged to GIS.		

Reliability

Reliability Index Selected

Rasch Reliability was selected as the most efficient and effective given that the Rasch model was used for evaluation of the examination.

Results

See Table 1 for Reliability statistics.

Essential Formula

Rasch Reliability is calculated as:

$$R_R = 1 - \frac{\Sigma (SEM)^2 / N}{Variance_{Observed Measure}}$$

Decision Consistency

Formula

The standard error of measure is used as a proxy for decision consistency. The formula is:

$$SEM = S\sqrt{1 - r_{xx}}$$

where SEM = Standard Error of Measure
S = Standard Deviation of the test
R_{xx} = Reliability of the test

Rationale for Selection

The SEM is the most appropriate tool used with the Rasch model.

Explanation

The Standard Error of the Measure provides an estimate of clarity of the measures, including an estimate of the stability of the cut score

Procedures

No pass/fail decisions are made using the product of this examination

Results

	Decisions on the reported examination(s) are verified.
	Decisions on the following examination(s) were inconsistent and were changed for the following reason:
✓	No student decisions are made on the basis of this exam.

Exam Statistics for Candidates

N and Passing* for Administration

Table 1 and Table 2 of this report for this information.

*Note there is no pass/fail associated with this examination.

Repeater Information

NA

ADA Testers

NA

Recommendations

Research to be Conducted

TBD

Validity Evidence

No additional validity evidence beyond that provided is included or deemed necessary under APA/AERA/NCME reporting requirements.

Areas to Enhance or Revise Before Next Exam

None noted.

Future Activities

All future activities are planned, and scheduled, according to the official timeline of activities and are not tied to the administration of an examination.

Maps and Statistics: Spatial Reasoning/GIS

Complete Exam (Prior to removal of Item 5 series)

Learning Partnership Exam 12/26/2020 2:20:07 PM
Table 6.0 All Facet Vertical "Rulers".

Vertical = (1*,2*,3*,S) Yardstick (columns lines low high extreme)= 0,3,-9,6,End

```

+-----+
|Measr|+Student  | |-Judge|-Items|Scale|
+-----+-----+-----+-----+
| 6 + |          | + * | + (3) | |
| | | | | |
| 5 + |          | + * | + |
| | | | | |
| 4 + |          | + * | + --- |
| | | | | |
| 3 + |          | + | + |
| | | | | |
| 2 + |          | + | + |
| | | | | |
| 1 + |          | + | + |
| | | | | |
* 0 * |          | * | * * * * *
| | | | | |
-1 + |          | + | * * * * *
| | | | | |
-2 + |          | + | * * * * *
| ** | | | | |
| ***** | | | | |
-3 + |          | + | * | + --- |
| ***** | | | | |
| ***** | | | | |
-4 + |          | + | * | + |
| ***** | | | | |
| * | | | | |
-5 + |          | + | + | + |
| * | | | | |
-6 + |          | + | + | + |
| | | | | |
-7 + |          | + | + | + |
| | | | | |
-8 + |          | + | + | + |
| | | | | |
-9 + |          | + | + | + (0) |
+-----+-----+-----+-----+
|Measr| * = 6 | * = 1 | * = 1 |Scale|
+-----+-----+-----+-----+

```

Total Score	Total Count	Obsvd Average	Fair-M Avrage Measure	Model S.E.	Infit MnSq ZStd	Outfit MnSq ZStd	Estim Discrm	Correlation PtMea PtExp	Num Student
27.6	46.2	.6	.36	-3.76	.32	1.01 -1	.94 .4	.60	Mean (Count: 316)
10.9	3.8	.2	.21	1.15	.17	.33 1.3	.87 .6	.14	S.D. (Population)
10.9	3.8	.2	.21	1.16	.17	.33 1.3	.87 .6	.14	S.D. (Sample)
With extremes, Model, Populn: RMSE .36 Adj (True) S.D. 1.10 Separation 3.04 Strata 4.38 Reliability .90 With extremes, Model, Sample: RMSE .36 Adj (True) S.D. 1.10 Separation 3.04 Strata 4.39 Reliability .90 Without extremes, Model, Populn: RMSE .31 Adj (True) S.D. .97 Separation 3.07 Strata 4.43 Reliability .90 Without extremes, Model, Sample: RMSE .31 Adj (True) S.D. .97 Separation 3.07 Strata 4.43 Reliability .90 With extremes, Model, Fixed (all same) chi-square: 2307.8 d.f.: 315 significance (probability): .00 With extremes, Model, Random (normal) chi-square: 230.4 d.f.: 314 significance (probability): 1.00									

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 Table 7.2.1 Judge Measurement Report (arranged by mN).

Total Score	Total Count	Obsvd Average	Fair-M Avrage	Model Measure	Infit S.E.	Outfit MnSq ZStd	Estim. Discrm	Correlation PtMea PtExp	Nu Judge
3914	7284	.6	.24	.24	.02	.86 -7.5	.91 -.4	1.02 .64 .62	76 76
4808	7308	.7	.36	-.24	.02	1.11 5.8	1.01 .1	.98 .65 .66	75 75
4361.0	7296.0	.6	.30	.00	.02	.99 -.8	.96 -.2	.64	Mean (Count: 2)
447.0	12.0	.1	.06	.24	.00	.12 6.7	.05 .3	.01	S.D. (Population)
632.2	17.0	.1	.09	.34	.00	.17 9.5	.07 .4	.01	S.D. (Sample)

Model, Populn: RMSE .02 Adj (True) S.D. .24 Separation 10.25 Strata 14.00 Reliability .99
 Model, Sample: RMSE .02 Adj (True) S.D. .34 Separation 14.53 Strata 19.70 Reliability 1.00
 Model, Fixed (all same) chi-square: 212.0 d.f.: 1 significance (probability): .00

Learning Partnership Exam 12/26/2020 2:20:07 PM
 Table 7.3.1 Items Measurement Report (arranged by mN).

Total Score	Total Count	Obsvd Average	Fair-M Avrage	Model Measure	Infit S.E.	Outfit MnSq ZStd	Estim. Discrm	Correlation PtMea PtExp	Nu Items
0	634	.0	.00	7.01	1.83	Maximum		.00 .00	23 Q5_G
1	634	.0	.00	5.80	1.00	1.00 .3	.48 .1	1.01 .04 .02	7 Q2a_G
2	634	.0	.00	5.11	.71	1.00 .2	1.21 .5	.99 .02 .04	20 Q4bc_G
4	635	.0	.00	4.41	.50	1.00 .1	.76 .0	1.00 .05 .05	10 Q2bc_G
7	635	.0	.01	3.85	.38	.99 .1	.66 -.3	1.01 .08 .07	17 Q4a_G
72	634	.1	.08	1.42	.12	1.08 .7	.89 -.4	1.00 .22 .20	22 Q5_S
126	634	.2	.15	.78	.10	1.12 1.4	1.26 1.6	.90 .19 .26	21 Q5_RF
205	635	.3	.26	.17	.08	1.11 1.5	.98 -.1	.95 .31 .33	16 Q4a_S
228	635	.4	.29	.03	.08	1.05 .7	.94 -.5	1.06 .40 .34	14 Q3b_R
293	635	.5	.39	-.33	.07	1.14 2.4	1.08 .8	.82 .29 .38	15 Q4a_RF
312	634	.5	.42	-.43	.07	1.17 2.9	1.26 2.8	.90 .40 .39	4 Q1b_R
315	634	.5	.42	-.44	.07	1.26 4.4	1.46 4.7	.58 .23 .39	6 Q2a_S
337	634	.5	.46	-.54	.07	1.01 .2	.94 -.7	.97 .38 .40	18 Q4bc_RF
382	634	.6	.53	-.75	.07	1.06 1.2	1.19 2.3	.75 .30 .42	5 Q2a_RF
407	634	.6	.57	-.85	.07	.96 -.7	.90 -1.4	1.09 .46 .43	19 Q4bc_S
459	635	.7	.66	-1.06	.06	.77 -5.1	.82 -2.9	1.23 .47 .45	8 Q2bc_RF
616	635	1.0	.94	-1.68	.06	.79 -4.8	.84 -3.0	1.19 .50 .50	9 Q2bc_S
649	633	1.0	1.01	-1.81	.06	1.14 2.7	1.15 2.6	.58 .55 .51	1 Q1a_I
685	635	1.1	1.07	-1.94	.06	.66 -8.0	.65 -7.2	1.49 .64 .52	13 Q3b_E
765	635	1.2	1.22	-2.26	.06	1.15 2.9	1.19 3.2	.70 .61 .54	11 Q3a_I
784	634	1.2	1.26	-2.34	.06	.72 -6.2	.81 -3.5	1.20 .55 .55	3 Q1b_E
982	635	1.6	1.62	-3.24	.07	1.03 .5	.89 -1.6	1.19 .67 .58	12 Q3b_C
1091	635	1.7	1.79	-3.89	.08	.93 -.9	.76 -3.1	1.17 .57 .58	2 Q1b_C
379.2	634.4	.6	.57	.30	.25	1.01 -.1	.96 -.3	.34	Mean (Count: 23)
319.7	.6	.5	.53	2.90	.41	.15 3.1	.24 2.7	.21	S.D. (Population)
326.8	.6	.5	.54	2.96	.42	.15 3.2	.24 2.7	.21	S.D. (Sample)

With extremes, Model, Populn: RMSE .48 Adj (True) S.D. 2.85 Separation 5.93 Strata 8.24 Reliability .97
 With extremes, Model, Sample: RMSE .48 Adj (True) S.D. 2.92 Separation 6.06 Strata 8.42 Reliability .97
 Without extremes, Model, Populn: RMSE .30 Adj (True) S.D. 2.56 Separation 8.48 Strata 11.64 Reliability .99
 Without extremes, Model, Sample: RMSE .30 Adj (True) S.D. 2.62 Separation 8.68 Strata 11.91 Reliability .99
 With extremes, Model, Fixed (all same) chi-square: 5197.1 d.f.: 22 significance (probability): .00
 With extremes, Model, Random (normal) chi-square: 20.1 d.f.: 21 significance (probability): .52

Final Exam (After removal of Item 5 series)

Learning Partnership Exam 12/26/2020 2:29:28 PM
Table 6.0 All Facet Vertical "Rulers".

Vertical = (1*,2*,3A,S) Yardstick (columns lines low high extreme)= 0,3,-9,6,End

Measr	+Student	-Judge	-Items	Scale
6	+	+	+ Q2a_G	+ (3)
5	+	+	Q4bc_G	
4	+	+	+ Q2bc_G	+ ---
3	+	+	+ Q4a_G	+ ---
2	+	+	+	+
1	+	+	+	2
*	0	*	* Q4a_S	*
			* Q3b_R	*
			Q1b_R	
			Q2a_S Q4a_RF Q4bc_RF	
-1	+	+	Q2a_RF	
			+ Q2bc_RF	+ ---
-2	+	+	Q1a_I	
			+ Q3a_I	+ 1
			Q2bc_S Q3b_E	
			Q1b_E	
-3	+	+	+ Q3b_C	+ ---
-4	+	+	Q1b_C	
-5	+	+	+	+
-6	+	+	+	+
-7	+	+	+	+
-8	+	+	+	+
-9	+	+	+	+ (0)
Measr	* = 6		* = 1 -Items	Scale

Learning Partnership Exam 12/26/2020 2:29:28 PM
 Table 7.1.1 Student Measurement Report (arranged by mN).

Total Score	Total Count	Obsvd Average	Fair-M Average	Measure	Model S.E.	Infit MnSq	ZStd	Outfit MnSq	ZStd	Estim. Discrm	Correlation PtMea	PtExp	Num	Student
51	40	1.3	1.19	-1.53	.31	1.38	1.4	1.27	.6	.49	.75	.80	30096	30096
49	40	1.2	1.10	-1.71	.30	1.23	.9	.95	.1	.89	.75	.79	30017	30017
45	40	1.1	.93	-2.06	.29	.83	-.7	.58	-.4	1.33	.78	.76	30034	30034
45	40	1.1	.93	-2.06	.29	1.31	1.2	.95	.1	.94	.71	.76	30149	30149
45	40	1.1	.93	-2.06	.29	.76	-1.0	.70	-.2	.97	.80	.76	30161	30161
44	40	1.1	.89	-2.15	.29	1.18	.8	.88	.0	.86	.73	.75	30023	30023
44	40	1.1	.89	-2.15	.29	1.16	.7	.84	.0	.90	.73	.75	30060	30060
43	40	1.1	.86	-2.23	.29	.65	-1.7	.48	-.5	1.38	.80	.74	30041	30041
43	40	1.1	.86	-2.23	.29	.92	-.2	.66	-.2	1.26	.75	.74	30061	30061
43	40	1.1	.86	-2.23	.29	.95	-.1	.68	-.2	1.14	.75	.74	30081	30081
43	40	1.1	.86	-2.23	.29	.64	-1.7	.47	-.5	1.43	.80	.74	30093	30093
43	40	1.1	.86	-2.23	.29	1.38	1.5	1.00	.2	.66	.69	.74	30151	30151
43	40	1.1	.86	-2.23	.29	1.01	.1	.71	-.1	1.13	.74	.74	30158	30158
42	40	1.1	.82	-2.31	.29	.95	-.1	.66	-.1	1.22	.74	.74	30016	30016
42	40	1.1	.82	-2.31	.29	1.44	1.8	1.30	.6	.33	.67	.74	30033	30033
42	40	1.1	.82	-2.31	.29	.86	-.5	.86	.0	.91	.74	.74	30046	30046
42	40	1.1	.82	-2.31	.29	.93	-.2	.73	.0	1.10	.75	.74	30129	30129
42	40	1.1	.82	-2.31	.29	1.14	.6	.91	.1	.70	.72	.74	31247	31247
41	40	1.0	.78	-2.40	.29	1.87	3.2	1.55	.8	-.07	.62	.73	30168	30168
41	40	1.0	.78	-2.40	.29	1.22	.9	.96	.2	.53	.70	.73	31273	31273
41	40	1.0	.78	-2.40	.29	1.11	.5	.81	.0	1.03	.71	.73	31350	31350
40	40	1.0	.74	-2.48	.28	.93	-.2	.71	.0	1.21	.73	.72	30024	30024
40	40	1.0	.74	-2.48	.28	.88	-.4	.78	.0	1.05	.73	.72	30047	30047
40	40	1.0	.74	-2.48	.28	.66	-1.6	.49	-.4	1.49	.77	.72	30068	30068
40	40	1.0	.74	-2.48	.28	.82	-.7	.59	-.2	1.26	.75	.72	30130	30130
40	40	1.0	.74	-2.48	.28	1.10	.5	.79	.0	1.13	.71	.72	30349	30349
40	40	1.0	.74	-2.48	.28	1.31	1.3	1.00	.2	.65	.68	.72	31281	31281
39	40	1.0	.71	-2.56	.28	.96	-.1	.80	.0	1.16	.72	.72	30025	30025
39	40	1.0	.71	-2.56	.28	1.01	.1	.85	.1	.99	.70	.72	30052	30052
39	40	1.0	.71	-2.56	.28	1.25	1.1	.94	.2	.71	.68	.72	30118	30118
39	40	1.0	.71	-2.56	.28	1.08	.4	.82	.0	.93	.70	.72	30121	30121
39	40	1.0	.71	-2.56	.28	1.64	2.5	1.27	.5	.07	.63	.72	30132	30132
39	40	1.0	.71	-2.56	.28	1.30	1.3	.97	.2	.85	.67	.72	30153	30153
39	40	1.0	.71	-2.56	.28	1.22	1.0	.94	.2	.75	.68	.72	30162	30162
39	40	1.0	.71	-2.56	.28	.74	-1.2	.55	-.2	1.31	.76	.72	31252	31252
39	40	1.0	.71	-2.56	.28	1.25	1.1	.93	.2	.88	.68	.72	31280	31280
39	40	1.0	.71	-2.56	.28	1.18	.8	.88	.1	.88	.68	.72	31402	31402
38	40	.9	.67	-2.64	.28	1.16	.7	.83	.1	1.05	.68	.71	30019	30019
38	40	.9	.67	-2.64	.28	1.53	2.1	8.82	3.6	-.39	.57	.71	30043	30043
38	40	.9	.67	-2.64	.28	.80	-.9	.58	-.2	1.41	.74	.71	30058	30058
38	40	.9	.67	-2.64	.28	.51	-2.7	.38	-.5	1.58	.79	.71	30080	30080
38	40	.9	.67	-2.64	.28	1.02	.1	.81	.1	.67	.71	.71	30133	30133
38	40	.9	.67	-2.64	.28	.84	-.6	.66	.0	1.06	.73	.71	30179	30179
38	40	.9	.67	-2.64	.28	.63	-1.8	.48	-.3	1.43	.77	.71	30342	30342
37	40	.9	.64	-2.72	.28	1.13	.6	.89	.2	.54	.68	.70	30022	30022
37	40	.9	.64	-2.72	.28	.73	-1.2	.53	-.2	1.41	.74	.70	30036	30036
37	40	.9	.64	-2.72	.28	.84	-.6	.65	.0	1.27	.72	.70	30078	30078
37	40	.9	.64	-2.72	.28	.93	-.2	.78	.0	1.14	.70	.70	30095	30095
37	40	.9	.64	-2.72	.28	1.24	1.0	.90	.2	.69	.67	.70	30136	30136
37	40	.9	.64	-2.72	.28	1.28	1.2	.93	.2	.77	.67	.70	30159	30159
36	40	.9	.60	-2.80	.28	.92	-.3	.66	.0	1.33	.70	.69	30027	30027
36	40	.9	.60	-2.80	.28	.86	-.5	.63	.0	1.34	.71	.69	30037	30037
36	40	.9	.60	-2.80	.28	1.08	.4	.93	.2	.83	.67	.69	30063	30063
36	40	.9	.60	-2.80	.28	1.02	.1	.73	.0	1.22	.69	.69	30067	30067
36	40	.9	.60	-2.80	.28	1.10	.5	.80	.1	1.07	.68	.69	30071	30071
36	40	.9	.60	-2.80	.28	.51	-2.6	.39	-.4	1.53	.78	.69	30123	30123
36	40	.9	.60	-2.80	.28	.84	-.6	.62	.0	1.36	.71	.69	30135	30135
36	40	.9	.60	-2.80	.28	.88	-.4	.72	.0	1.20	.70	.69	30137	30137
36	40	.9	.60	-2.80	.28	1.20	.9	.96	.3	.53	.66	.69	30142	30142
36	40	.9	.60	-2.80	.28	.67	-1.6	.52	-.2	1.43	.74	.69	30155	30155
36	40	.9	.60	-2.80	.28	1.72	2.7	1.30	.6	.38	.59	.69	30174	30174
36	40	.9	.60	-2.80	.28	.88	-.4	.69	.0	1.09	.71	.69	30337	30337
36	40	.9	.60	-2.80	.28	.91	-.3	1.73	.9	1.02	.68	.69	30343	30343
36	40	.9	.60	-2.80	.28	.78	-1.0	.58	-.1	1.38	.73	.69	31250	31250
36	40	.9	.60	-2.80	.28	.80	-.9	1.66	.8	1.08	.69	.69	31260	31260
36	40	.9	.60	-2.80	.28	1.13	.6	7.64	3.1	.15	.57	.69	31271	31271
36	40	.9	.60	-2.80	.28	.99	.0	5.89	2.7	.57	.62	.69	31353	31353
35	40	.9	.57	-2.88	.28	.78	-1.0	.58	-.1	1.40	.72	.69	30018	30018
35	40	.9	.57	-2.88	.28	1.28	1.2	.94	.2	.88	.64	.69	30032	30032
35	40	.9	.57	-2.88	.28	1.28	1.2	3.03	1.6	.56	.61	.69	30072	30072
35	40	.9	.57	-2.88	.28	.77	-1.0	.56	-.1	1.32	.72	.69	30079	30079
35	40	.9	.57	-2.88	.28	.67	-1.6	.49	-.2	1.44	.74	.69	30082	30082
35	40	.9	.57	-2.88	.28	.87	-.5	.63	.0	1.36	.70	.69	30087	30087
35	40	.9	.57	-2.88	.28	.74	-1.2	.56	-.1	1.40	.72	.69	30128	30128
35	40	.9	.57	-2.88	.28	.95	-.1	.73	.0	1.08	.69	.69	30138	30138
35	40	.9	.57	-2.88	.28	.97	.0	.72	.0	1.18	.69	.69	30150	30150
35	40	.9	.57	-2.88	.28	.72	-1.3	.53	-.1	1.49	.73	.69	30156	30156
35	40	.9	.57	-2.88	.28	.89	-.4	.66	.0	1.29	.70	.69	30167	30167
35	40	.9	.57	-2.88	.28	1.13	.6	.84	.1	.86	.66	.69	31248	31248
35	40	.9	.57	-2.88	.28	.91	-.3	.70	.0	1.25	.70	.69	31255	31255
35	40	.9	.57	-2.88	.28	.56	-2.3	.43	-.3	1.56	.76	.69	31275	31275

34	40	.9	.54	-2.96	.28	1.32	1.3	.97	.3	.84	.63	.68	30031	30031
34	40	.9	.54	-2.96	.28	1.05	.2	1.06	.4	.82	.65	.68	30040	30040
34	40	.9	.54	-2.96	.28	1.00	.0	.72	.0	1.24	.68	.68	30062	30062
34	40	.9	.54	-2.96	.28	.90	-.3	.65	.0	1.30	.69	.68	30065	30065
34	40	.9	.54	-2.96	.28	1.00	.0	.81	.1	1.04	.67	.68	30073	30073
34	40	.9	.54	-2.96	.28	.73	-1.3	.54	-.1	1.44	.72	.68	30154	30154
34	40	.9	.54	-2.96	.28	.71	-1.4	.53	-.1	1.41	.72	.68	30164	30164
34	40	.9	.54	-2.96	.28	1.05	.2	.77	.1	1.23	.67	.68	30166	30166
34	40	.9	.54	-2.96	.28	.92	-.3	.67	.0	1.28	.69	.68	30341	30341
34	40	.9	.54	-2.96	.28	1.49	2.0	1.31	.6	.15	.57	.68	31290	31290
34	40	.9	.54	-2.96	.28	.89	-.4	.83	.2	.82	.69	.68	31295	31295
33	40	.8	.51	-3.04	.28	.86	-.5	.63	.0	1.32	.69	.67	30026	30026
33	40	.8	.51	-3.04	.28	1.18	.8	.87	.2	.93	.64	.67	30028	30028
33	40	.8	.51	-3.04	.28	.88	-.5	.65	.0	1.41	.69	.67	30049	30049
33	40	.8	.51	-3.04	.28	.76	-1.1	.57	.0	1.43	.70	.67	30057	30057
33	40	.8	.51	-3.04	.28	.94	-.2	.80	.1	.95	.67	.67	30141	30141
33	40	.8	.51	-3.04	.28	1.00	.0	.79	.1	.90	.67	.67	30144	30144
33	40	.8	.51	-3.04	.28	.77	-1.0	.59	.0	1.42	.70	.67	30169	30169
33	40	.8	.51	-3.04	.28	.95	-.1	.80	.1	.95	.67	.67	30340	30340
33	40	.8	.51	-3.04	.28	1.48	2.0	1.15	.5	.54	.59	.67	31397	31397
21	27	.8	.49	-3.09	.35	.51	-2.1	.40	-.2	1.43	.78	.69	30122	30122
32	40	.8	.48	-3.12	.28	1.06	.3	.80	.2	1.10	.65	.66	30020	30020
32	40	.8	.48	-3.12	.28	1.15	.7	.84	.2	1.06	.64	.66	30021	30021
32	40	.8	.48	-3.12	.28	.90	-.4	.80	.2	1.12	.66	.66	30044	30044
32	40	.8	.48	-3.12	.28	.55	-2.4	.43	-.2	1.54	.74	.66	30053	30053
32	40	.8	.48	-3.12	.28	1.11	.5	1.00	.3	.69	.62	.66	30059	30059
32	40	.8	.48	-3.12	.28	1.40	1.6	1.06	.4	.70	.60	.66	30070	30070
32	40	.8	.48	-3.12	.28	1.51	2.0	2.86	1.4	.12	.53	.66	30083	30083
32	40	.8	.48	-3.12	.28	.95	-.1	.71	.1	1.04	.67	.66	30092	30092
32	40	.8	.48	-3.12	.28	1.17	.8	.90	.3	.75	.63	.66	30107	30107
32	40	.8	.48	-3.12	.28	.82	-.8	.60	.0	1.51	.69	.66	30109	30109
32	40	.8	.48	-3.12	.28	.82	-.7	.66	.0	1.16	.69	.66	30114	30114
32	40	.8	.48	-3.12	.28	.87	-.5	.69	.1	1.13	.68	.66	30120	30120
32	40	.8	.48	-3.12	.28	.90	-.3	.69	.1	1.28	.67	.66	30125	30125
32	40	.8	.48	-3.12	.28	1.24	1.0	.93	.3	.98	.63	.66	30134	30134
32	40	.8	.48	-3.12	.28	.84	-.7	.68	.0	1.20	.68	.66	30143	30143
32	40	.8	.48	-3.12	.28	.71	-1.3	.53	.0	1.53	.71	.66	30345	30345
32	40	.8	.48	-3.12	.28	.62	-1.9	.49	-.1	1.45	.73	.66	31283	31283
32	40	.8	.48	-3.12	.28	.53	-2.5	.49	-.1	1.19	.80	.66	31294	31294
32	40	.8	.48	-3.12	.28	1.09	.4	.82	.2	.90	.64	.66	31315	31315
62	80	.8	.45	-3.20	.20	.72	-1.9	.59	-.2	1.36	.69	.65	30050	30050
31	40	.8	.45	-3.20	.28	.68	-1.5	.52	.0	1.47	.70	.65	30066	30066
31	40	.8	.45	-3.20	.28	.55	-2.3	.46	-.1	1.49	.73	.65	30111	30111
31	40	.8	.45	-3.20	.28	1.13	.6	.81	.2	1.05	.64	.65	30115	30115
31	40	.8	.45	-3.20	.28	.97	.0	.74	.1	1.15	.66	.65	30350	30350
31	40	.8	.45	-3.20	.28	.74	-1.2	.55	.0	1.46	.69	.65	31267	31267
31	40	.8	.45	-3.20	.28	.38	-3.7	.33	-.3	1.53	.80	.65	31357	31357
30	40	.8	.43	-3.28	.29	1.39	1.6	1.19	.5	.43	.56	.65	30042	30042
30	40	.8	.43	-3.28	.29	.90	-.4	.67	.1	1.24	.66	.65	30064	30064
30	40	.8	.43	-3.28	.29	1.17	.8	.93	.3	.90	.61	.65	30075	30075
30	40	.8	.43	-3.28	.29	1.34	1.4	1.04	.4	.83	.60	.65	30094	30094
30	40	.8	.43	-3.28	.29	.68	-1.5	.53	.0	1.43	.70	.65	30131	30131
30	40	.8	.43	-3.28	.29	.73	-1.2	.56	.0	1.44	.69	.65	30178	30178
30	40	.8	.43	-3.28	.29	.72	-1.3	.55	.0	1.32	.69	.65	31246	31246
30	40	.8	.43	-3.28	.29	1.31	1.3	1.03	.4	.78	.60	.65	31254	31254
30	40	.8	.43	-3.28	.29	.66	-1.6	.53	.0	1.42	.70	.65	31257	31257
30	40	.8	.43	-3.28	.29	1.01	.1	.76	.2	.96	.64	.65	31258	31258
30	40	.8	.43	-3.28	.29	.69	-1.5	.57	.0	1.37	.69	.65	31263	31263
30	40	.8	.43	-3.28	.29	.60	-2.0	.48	.0	1.41	.72	.65	31266	31266
30	40	.8	.43	-3.28	.29	1.18	.8	.87	.3	.81	.61	.65	31390	31390
29	40	.7	.40	-3.36	.29	.98	.0	.76	.2	1.11	.64	.64	30035	30035
29	40	.7	.40	-3.36	.29	1.10	.5	.93	.3	.61	.61	.64	30048	30048
29	40	.7	.40	-3.36	.29	.90	-.3	.66	.1	1.31	.65	.64	30086	30086
29	40	.7	.40	-3.36	.29	1.01	.1	.80	.2	1.07	.63	.64	30088	30088
29	40	.7	.40	-3.36	.29	1.50	2.0	1.22	.6	.52	.56	.64	30344	30344
29	40	.7	.40	-3.36	.29	.71	-1.3	.55	.0	1.21	.69	.64	31279	31279
29	40	.7	.40	-3.36	.29	.78	-1.0	.70	.1	.95	.69	.64	31301	31301
29	40	.7	.40	-3.36	.29	.79	-.9	.72	.2	1.06	.67	.64	31314	31314
29	40	.7	.40	-3.36	.29	1.09	.4	.98	.4	.84	.61	.64	31374	31374
28	40	.7	.38	-3.45	.29	.80	-.8	.66	.1	1.03	.67	.63	30054	30054
28	40	.7	.38	-3.45	.29	.88	-.4	.68	.2	1.21	.64	.63	30076	30076
28	40	.7	.38	-3.45	.29	.94	-.1	.85	.3	1.12	.63	.63	30124	30124
28	40	.7	.38	-3.45	.29	1.01	.1	.84	.3	.97	.61	.63	30140	30140
28	40	.7	.38	-3.45	.29	.89	-.4	.69	.2	1.27	.64	.63	30163	30163
28	40	.7	.38	-3.45	.29	.89	-.4	.86	.3	1.21	.64	.63	30171	30171
28	40	.7	.38	-3.45	.29	1.01	.1	.83	.3	1.10	.62	.63	30172	30172
28	40	.7	.38	-3.45	.29	.75	-1.1	.56	.0	1.40	.67	.63	30348	30348
28	40	.7	.38	-3.45	.29	.76	-1.0	4.35	1.8	.98	.62	.63	31262	31262
28	40	.7	.38	-3.45	.29	.68	-1.5	.52	.0	1.47	.68	.63	31270	31270
28	40	.7	.38	-3.45	.29	.99	.0	.75	.2	.97	.63	.63	31352	31352
28	40	.7	.38	-3.45	.29	1.09	.4	.81	.3	.91	.61	.63	31367	31367
28	40	.7	.38	-3.45	.29	.98	.0	.99	.4	.82	.62	.63	31371	31371
28	40	.7	.38	-3.45	.29	1.03	.2	.82	.3	1.05	.62	.63	31373	31373
27	40	.7	.35	-3.53	.29	1.09	.4	.91	.4	.65	.59	.62	30069	30069
27	40	.7	.35	-3.53	.29	.70	-1.4	.55	.1	1.38	.66	.62	30074	30074
27	40	.7	.35	-3.53	.29	.82	-.7	.65	.2	1.17	.65	.62	30091	30091
27	40	.7	.35	-3.53	.29	.78	-.9	.66	.2	1.07	.66	.62	30145	30145
27	40	.7	.35	-3.53	.29	1.28	1.2	1.14	.5	.59	.56	.62	30160	30160

27	40	.7	.35	-3.53	.29	.71	-1.3	.53	.0	1.47	.67	.62	30165	30165
27	40	.7	.35	-3.53	.29	.83	-.7	.61	.1	1.46	.65	.62	30347	30347
27	40	.7	.35	-3.53	.29	.38	-3.5	.33	-.1	1.67	.73	.62	31317	31317
27	40	.7	.35	-3.53	.29	.90	-.3	.77	.3	.92	.64	.62	31351	31351
27	40	.7	.35	-3.53	.29	1.23	1.0	1.06	.5	.46	.56	.62	31358	31358
27	40	.7	.35	-3.53	.29	1.69	2.6	1.67	.8	-.19	.50	.62	31394	31394
53	80	.7	.34	-3.57	.21	1.56	3.0	1.37	.6	.43	.53	.61	30038	30038
26	40	.7	.33	-3.61	.29	.79	-.9	.65	.2	1.23	.64	.61	30015	30015
26	40	.7	.33	-3.61	.29	.94	-.1	.71	.2	1.11	.62	.61	30029	30029
26	40	.7	.33	-3.61	.29	1.04	.2	.92	.4	.82	.58	.61	30039	30039
26	40	.7	.33	-3.61	.29	.91	-.3	.73	.3	1.14	.62	.61	30051	30051
26	40	.7	.33	-3.61	.29	.90	-.3	.68	.2	1.23	.62	.61	30110	30110
26	40	.7	.33	-3.61	.29	1.00	.0	.80	.3	.94	.60	.61	30126	30126
26	40	.7	.33	-3.61	.29	.90	-.3	.83	.3	.98	.62	.61	31245	31245
26	40	.7	.33	-3.61	.29	1.45	1.8	1.09	.5	.72	.55	.61	31272	31272
26	40	.7	.33	-3.61	.29	.90	-.3	.67	.2	1.07	.63	.61	31284	31284
26	40	.7	.33	-3.61	.29	.82	-.7	9.00	3.4	.52	.57	.61	31291	31291
26	40	.7	.33	-3.61	.29	.78	-.9	.69	.2	.98	.65	.61	31302	31302
26	40	.7	.33	-3.61	.29	.64	-1.7	.54	.1	1.43	.67	.61	31356	31356
26	40	.7	.33	-3.61	.29	1.12	.5	.87	.4	.82	.58	.61	31360	31360
26	40	.7	.33	-3.61	.29	.57	-2.1	.47	.0	1.45	.69	.61	31361	31361
26	40	.7	.33	-3.61	.29	1.05	.2	.84	.3	.93	.60	.61	31396	31396
24	37	.6	.31	-3.67	.31	.77	-.9	.62	.2	1.21	.65	.61	31278	31278
25	40	.6	.31	-3.70	.29	.98	.0	.78	.3	1.01	.60	.60	30084	30084
25	40	.6	.31	-3.70	.29	1.43	1.7	3.87	1.6	.25	.49	.60	30090	30090
25	40	.6	.31	-3.70	.29	1.18	.8	.96	.5	.76	.56	.60	30147	30147
25	40	.6	.31	-3.70	.29	.67	-1.5	.52	.1	1.54	.65	.60	30351	30351
25	40	.6	.31	-3.70	.29	1.39	1.6	1.25	.6	.37	.51	.60	31287	31287
24	40	.6	.28	-3.79	.30	.98	.0	.77	.4	1.03	.59	.60	30117	30117
24	40	.6	.28	-3.79	.30	.87	-.5	.65	.3	1.20	.61	.60	31256	31256
24	40	.6	.28	-3.79	.30	1.03	.2	.83	.4	1.03	.58	.60	31259	31259
24	40	.6	.28	-3.79	.30	.83	-.7	.65	.3	1.38	.62	.60	31277	31277
24	40	.6	.28	-3.79	.30	.40	-3.3	.34	.0	1.64	.71	.60	31296	31296
24	40	.6	.28	-3.79	.30	.67	-1.5	.53	.2	1.42	.65	.60	31335	31335
24	40	.6	.28	-3.79	.30	.69	-1.4	.55	.2	1.28	.65	.60	31344	31344
24	40	.6	.28	-3.79	.30	.82	-.7	.65	.3	1.11	.62	.60	31346	31346
24	40	.6	.28	-3.79	.30	.67	-1.5	.63	.2	1.09	.66	.60	31347	31347
24	40	.6	.28	-3.79	.30	.64	-1.7	.54	.2	1.30	.65	.60	31398	31398
18	29	.6	.27	-3.84	.35	1.33	1.2	1.01	.6	.75	.55	.61	31276	31276
23	40	.6	.26	-3.88	.30	1.11	.5	.86	.4	.84	.56	.59	30339	30339
23	40	.6	.26	-3.88	.30	.75	-1.1	.67	.3	1.01	.63	.59	31292	31292
23	40	.6	.26	-3.88	.30	.53	-2.3	.45	.1	1.40	.67	.59	31297	31297
23	40	.6	.26	-3.88	.30	.70	-1.3	.68	.3	1.05	.63	.59	31305	31305
23	40	.6	.26	-3.88	.30	.83	-.6	.71	.3	1.07	.60	.59	31366	31366
23	40	.6	.26	-3.88	.30	.93	-.2	.68	.3	1.15	.60	.59	31376	31376
23	40	.6	.26	-3.88	.30	1.06	.3	.91	.5	.89	.57	.59	31391	31391
22	37	.6	.26	-3.91	.31	.90	-.3	.70	.3	1.19	.60	.59	30152	30152
22	40	.6	.24	-3.97	.30	.94	-.1	.68	.4	1.18	.59	.58	30127	30127
22	40	.6	.24	-3.97	.30	1.20	.8	.90	.5	.88	.55	.58	30176	30176
22	40	.6	.24	-3.97	.30	1.92	3.1	1.41	.8	.21	.45	.58	30346	30346
22	40	.6	.24	-3.97	.30	.93	-.2	.72	.4	1.13	.58	.58	31249	31249
22	40	.6	.24	-3.97	.30	.63	-1.7	.67	.4	.99	.66	.58	31288	31288
22	40	.6	.24	-3.97	.30	.64	-1.6	.62	.3	1.28	.62	.58	31298	31298
22	40	.6	.24	-3.97	.30	.74	-1.1	.65	.3	1.16	.62	.58	31362	31362
22	40	.6	.24	-3.97	.30	.69	-1.4	.67	.3	1.09	.62	.58	31372	31372
22	40	.6	.24	-3.97	.30	.65	-1.6	.61	.3	1.30	.63	.58	31375	31375
22	40	.6	.24	-3.97	.30	1.25	1.0	1.01	.6	.68	.52	.58	31382	31382
22	40	.6	.24	-3.97	.30	.99	.0	.82	.5	1.03	.57	.58	31385	31385
21	40	.5	.22	-4.06	.31	1.05	.2	.79	.5	1.14	.57	.57	30077	30077
21	40	.5	.22	-4.06	.31	1.33	1.3	.95	.6	.78	.52	.57	30112	30112
21	40	.5	.22	-4.06	.31	.77	-.9	.58	.3	1.35	.60	.57	30113	30113
21	40	.5	.22	-4.06	.31	.67	-1.4	.50	.3	1.48	.62	.57	30148	30148
21	40	.5	.22	-4.06	.31	1.12	.5	.86	.5	1.00	.55	.57	31244	31244
21	40	.5	.22	-4.06	.31	.96	.0	.78	.5	1.10	.57	.57	31282	31282
21	40	.5	.22	-4.06	.31	.73	-1.1	.63	.4	1.16	.61	.57	31286	31286
21	40	.5	.22	-4.06	.31	.89	-.3	.79	.5	.97	.57	.57	31293	31293
21	40	.5	.22	-4.06	.31	1.02	.1	1.06	.6	.79	.54	.57	31299	31299
21	40	.5	.22	-4.06	.31	1.58	2.1	1.84	.9	.11	.42	.57	31320	31320
21	40	.5	.22	-4.06	.31	.68	-1.4	.69	.4	1.37	.61	.57	31330	31330
21	40	.5	.22	-4.06	.31	.70	-1.3	.66	.4	1.23	.60	.57	31364	31364
21	40	.5	.22	-4.06	.31	.45	-2.8	.37	.1	1.54	.67	.57	31365	31365
21	40	.5	.22	-4.06	.31	1.10	.4	.93	.5	1.02	.55	.57	31393	31393
20	40	.5	.21	-4.16	.31	.58	-1.9	.42	.2	1.61	.63	.56	30173	30173
20	40	.5	.21	-4.16	.31	1.06	.3	.95	.6	.85	.53	.56	30177	30177
20	40	.5	.21	-4.16	.31	1.02	.1	1.16	.7	1.02	.54	.56	31304	31304
20	40	.5	.21	-4.16	.31	.44	-2.8	.46	.3	1.56	.64	.56	31309	31309
20	40	.5	.21	-4.16	.31	.98	.0	.82	.5	.90	.55	.56	31325	31325
20	40	.5	.21	-4.16	.31	.86	-.5	.69	.4	1.11	.57	.56	31355	31355
20	40	.5	.21	-4.16	.31	.57	-2.0	.58	.4	1.34	.62	.56	31363	31363
20	40	.5	.21	-4.16	.31	1.80	2.7	1.36	.8	.28	.43	.56	31370	31370
20	40	.5	.21	-4.16	.31	.50	-2.4	.40	.2	1.54	.64	.56	31377	31377
20	40	.5	.21	-4.16	.31	.89	-.3	.79	.5	1.01	.57	.56	31378	31378
20	40	.5	.21	-4.16	.31	1.09	.4	.77	.5	1.11	.55	.56	31379	31379
19	40	.5	.19	-4.26	.32	.78	-.8	.62	.4	1.22	.58	.55	31311	31311
19	40	.5	.19	-4.26	.32	.65	-1.5	.62	.4	1.12	.61	.55	31337	31337
19	40	.5	.19	-4.26	.32	.74	-1.0	.70	.5	1.17	.58	.55	31349	31349
19	40	.5	.19	-4.26	.32	.76	-.9	.67	.5	1.13	.57	.55	31354	31354
19	40	.5	.19	-4.26	.32	1.50	1.8	1.49	.9	.38	.44	.55	31368	31368

19	40	.5	.19	-4.26	.32	2.75	4.9	2.11	1.1	-.63	.35	.55	31384	31384
19	40	.5	.19	-4.26	.32	1.08	.3	.81	.5	1.00	.53	.55	31401	31401
18	40	.5	.17	-4.36	.32	1.63	2.1	1.11	.7	.43	.43	.54	30089	30089
18	40	.5	.17	-4.36	.32	1.00	.0	.98	.7	.79	.51	.54	31303	31303
18	40	.5	.17	-4.36	.32	.79	-.7	.71	.5	1.11	.56	.54	31323	31323
17	40	.4	.16	-4.46	.33	1.02	.1	.88	.7	.90	.51	.53	31359	31359
16	40	.4	.14	-4.57	.33	1.25	.9	.96	.8	.85	.47	.52	30030	30030
16	40	.4	.14	-4.57	.33	1.42	1.4	1.34	.9	.51	.42	.52	31289	31289
16	40	.4	.14	-4.57	.33	.64	-1.4	.70	.6	1.06	.57	.52	31300	31300
16	40	.4	.14	-4.57	.33	1.02	.1	.86	.7	.78	.51	.52	31319	31319
16	40	.4	.14	-4.57	.33	1.06	.3	.87	.7	.78	.49	.52	31326	31326
16	40	.4	.14	-4.57	.33	1.20	.7	1.09	.8	.66	.45	.52	31333	31333
16	40	.4	.14	-4.57	.33	1.39	1.4	1.32	.9	.60	.44	.52	31369	31369
15	40	.4	.13	-4.68	.34	.73	-1.0	.44	.5	1.41	.56	.50	31313	31313
15	40	.4	.13	-4.68	.34	.98	.0	.72	.7	.98	.50	.50	31331	31331
15	40	.4	.13	-4.68	.34	1.54	1.8	1.28	.9	.47	.40	.50	31403	31403
15	40	.4	.13	-4.68	.34	1.25	.9	.85	.8	.91	.47	.50	31406	31406
14	40	.3	.12	-4.80	.35	2.06	3.0	1.53	1.0	.13	.31	.49	30085	30085
14	40	.3	.12	-4.80	.35	1.03	.2	.82	.8	.92	.47	.49	31324	31324
14	40	.3	.12	-4.80	.35	1.30	1.0	1.03	.9	.61	.42	.49	31339	31339
14	40	.3	.12	-4.80	.35	.87	-.4	.65	.7	1.14	.51	.49	31399	31399
14	40	.3	.12	-4.80	.35	.98	.0	.82	.8	1.06	.48	.49	31404	31404
13	40	.3	.10	-4.92	.35	1.62	1.9	1.04	.9	.70	.40	.48	31251	31251
13	40	.3	.10	-4.92	.35	1.31	1.0	1.02	.9	.76	.42	.48	31400	31400
12	40	.3	.09	-5.05	.36	.74	-.8	.39	.7	1.41	.52	.46	31328	31328
12	40	.3	.09	-5.05	.36	1.44	1.4	1.77	1.2	.33	.31	.46	31348	31348
12	40	.3	.09	-5.05	.36	2.11	2.9	1.47	1.1	.14	.27	.46	31389	31389
11	40	.3	.08	-5.18	.37	.73	-.8	.68	1.0	1.06	.49	.45	31316	31316
11	40	.3	.08	-5.18	.37	.65	-1.2	.56	.9	1.27	.50	.45	31321	31321
11	40	.3	.08	-5.18	.37	1.95	2.5	1.24	1.1	.48	.32	.45	31383	31383
10	40	.3	.07	-5.33	.39	1.42	1.2	1.30	1.2	.56	.32	.43	31307	31307
10	40	.3	.07	-5.33	.39	1.12	.4	1.04	1.2	.87	.39	.43	31318	31318
10	40	.3	.07	-5.33	.39	1.01	.1	.47	1.0	1.15	.46	.43	31327	31327
10	40	.3	.07	-5.33	.39	1.23	.7	1.23	1.2	.67	.35	.43	31332	31332
10	40	.3	.07	-5.33	.39	1.03	.2	.64	1.0	1.04	.43	.43	31340	31340
10	40	.3	.07	-5.33	.39	1.03	.2	.90	1.1	.89	.41	.43	31341	31341
10	40	.3	.07	-5.33	.39	2.40	3.3	2.30	1.4	-.02	.19	.43	31388	31388
9	40	.2	.06	-5.49	.40	1.19	.6	1.01	1.2	.87	.37	.42	31308	31308
8	40	.2	.05	-5.66	.42	2.22	2.7	1.53	1.5	.36	.22	.40	30157	30157
8	40	.2	.05	-5.66	.42	2.06	2.4	1.19	1.4	.51	.26	.40	30352	30352
8	40	.2	.05	-5.66	.42	1.09	.3	.81	1.3	1.00	.38	.40	31334	31334
8	40	.2	.05	-5.66	.42	.91	-.1	.86	1.3	.93	.39	.40	31345	31345
8	40	.2	.05	-5.66	.42	1.73	1.8	.73	1.3	.87	.35	.40	31392	31392
7	40	.2	.04	-5.84	.44	1.23	.7	.75	1.4	1.00	.36	.38	31380	31380
6	40	.2	.03	-6.05	.47	.96	.0	.66	1.6	1.05	.36	.36	31306	31306
6	40	.2	.03	-6.05	.47	1.26	.7	1.29	1.7	.90	.31	.36	31329	31329
6	40	.2	.03	-6.05	.47	1.23	.6	.49	1.5	1.10	.36	.36	31381	31381
5	40	.1	.03	-6.29	.51	.83	-.2	1.13	1.9	.96	.33	.33	31310	31310
5	40	.1	.03	-6.29	.51	.88	-.1	.34	1.7	1.18	.37	.33	31336	31336
5	40	.1	.03	-6.29	.51	1.03	.2	1.18	1.9	.97	.31	.33	31386	31386
3	40	.1	.01	-6.91	.63	1.28	.6	.40	2.5	1.07	.27	.27	31338	31338
3	40	.1	.01	-6.91	.63	1.97	1.5	1.02	2.6	.77	.17	.27	31395	31395
2	40	.1	.01	-7.38	.75	1.53	.8	.24	2.8	1.12	.24	.22	31322	31322
2	40	.1	.01	-7.38	.75	.90	.0	.30	2.8	1.07	.26	.22	31343	31343
2	40	.1	.01	-7.38	.75	1.25	.5	1.97	3.0	.73	.10	.22	31387	31387
1	40	.0	.00	-8.13	1.03	1.06	.3	.47	3.1	.97	.15	.16	31405	31405
0	40	.0	.00	(-9.38	1.84)	Minimum					.00	.00	31285	31285
0	40	.0	.00	(-9.38	1.84)	Minimum					.00	.00	31312	31312
0	40	.0	.00	(-9.38	1.84)	Minimum					.00	.00	31342	31342

Total Score	Total Count	Obsvd Average	Fair-M Avrage	Model Measure	Infit S.E.	Outfit MnSq	Estim. ZStd	Correlation PtMea	Correlation PtExp	Num	Student
27.0	40.2	.7	.39	-3.67	.33	1.01	-.1	.93	.5		Mean (Count: 316)
10.6	3.3	.3	.23	1.17	.17	.34	1.3	.91	.7		S.D. (Population)
10.6	3.3	.3	.23	1.17	.17	.34	1.3	.91	.7		S.D. (Sample)

With extremes, Model, Populn: RMSE .37 Adj (True) S.D. 1.11 Separation 3.01 Strata 4.35 Reliability .90
 With extremes, Model, Sample: RMSE .37 Adj (True) S.D. 1.11 Separation 3.02 Strata 4.36 Reliability .90
 Without extremes, Model, Populn: RMSE .32 Adj (True) S.D. .98 Separation 3.04 Strata 4.38 Reliability .90
 Without extremes, Model, Sample: RMSE .32 Adj (True) S.D. .98 Separation 3.04 Strata 4.39 Reliability .90
 With extremes, Model, Fixed (all same) chi-square: 2279.5 d.f.: 315 significance (probability): .00
 With extremes, Model, Random (normal) chi-square: 231.7 d.f.: 314 significance (probability): 1.00

Learning Partnership Exam 12/26/2020 2:29:28 PM
 Table 7.2.1 Judge Measurement Report (arranged by mN).

Total Score	Total Count	Obsvd Average	Fair-M Average	Model Measure	S.E.	Infit MnSq	ZStd	Outfit MnSq	ZStd	Estim. Discrm	Correlation PtMea	PtExp	Nu Judge
3826	6336	.6	.26	.25	.02	.87	-7.3	.88	-.5	1.03	.65	.63	76 76
4698	6354	.7	.40	-.25	.02	1.11	5.8	1.02	.1	.97	.66	.67	75 75
4262.0	6345.0	.7	.33	.00	.02	.99	-.8	.95	-.2		.65		Mean (Count: 2)
436.0	9.0	.1	.07	.25	.00	.12	6.6	.07	.4		.01		S.D. (Population)
616.6	12.7	.1	.09	.35	.00	.17	9.4	.10	.5		.01		S.D. (Sample)

Model, Populn: RMSE .02 Adj (True) S.D. .25 Separation 10.29 Strata 14.05 Reliability .99
 Model, Sample: RMSE .02 Adj (True) S.D. .35 Separation 14.58 Strata 19.78 Reliability 1.00
 Model, Fixed (all same) chi-square: 213.6 d.f.: 1 significance (probability): .00

Learning Partnership Exam 12/26/2020 2:29:28 PM
 Table 7.3.1 Items Measurement Report (arranged by mN).

Total Score	Total Count	Obsvd Average	Fair-M Average	Model Measure	S.E.	Infit MnSq	ZStd	Outfit MnSq	ZStd	Estim. Discrm	Correlation PtMea	PtExp	Nu Items
1	634	.0	.00	5.93	1.00	1.00	.3	.44	.1	1.01	.04	.03	7 Q2a_G
2	634	.0	.00	5.24	.71	1.00	.2	1.21	.5	.99	.02	.04	20 Q4bc_G
4	635	.0	.00	4.54	.50	1.00	.1	.72	.0	1.00	.05	.05	10 Q2bc_G
7	635	.0	.01	3.98	.38	.99	.1	.68	-.2	1.01	.08	.07	17 Q4a_G
205	635	.3	.26	.29	.08	1.12	1.8	1.01	.1	.93	.30	.33	16 Q4a_S
228	635	.4	.29	.15	.08	1.04	.6	.93	-.5	1.07	.41	.35	14 Q3b_R
293	635	.5	.39	-.21	.07	1.16	2.7	1.10	1.1	.79	.29	.38	15 Q4a_RF
312	634	.5	.42	-.31	.07	1.17	2.9	1.26	2.7	.90	.41	.40	4 Q1b_R
315	634	.5	.42	-.33	.07	1.28	4.6	1.47	4.8	.57	.23	.40	6 Q2a_S
337	634	.5	.46	-.43	.07	1.03	.6	.96	-.4	.94	.37	.41	18 Q4bc_RF
382	634	.6	.53	-.64	.07	1.08	1.5	1.20	2.5	.73	.30	.43	5 Q2a_RF
407	634	.6	.57	-.74	.07	.98	-.3	.92	-1.0	1.05	.45	.44	19 Q4bc_S
459	635	.7	.66	-.96	.06	.78	-4.8	.83	-2.6	1.20	.47	.46	8 Q2bc_RF
616	635	1.0	.94	-1.58	.06	.80	-4.6	.84	-2.8	1.18	.50	.51	9 Q2bc_S
649	633	1.0	1.01	-1.71	.06	1.13	2.6	1.15	2.6	.60	.56	.52	1 Q1a_I
685	635	1.1	1.07	-1.85	.06	.66	-8.0	.65	-7.3	1.49	.65	.53	13 Q3b_E
765	635	1.2	1.22	-2.17	.06	1.15	2.8	1.18	3.1	.71	.62	.55	11 Q3a_I
784	634	1.2	1.26	-2.25	.06	.72	-6.3	.81	-3.5	1.21	.55	.55	3 Q1b_E
982	635	1.6	1.62	-3.16	.07	1.04	.6	.89	-1.6	1.18	.66	.58	12 Q3b_C
1091	635	1.7	1.79	-3.81	.08	.93	-.9	.76	-3.1	1.17	.57	.58	2 Q1b_C
426.2	634.5	.7	.65	.00	.18	1.00	-.2	.95	-.3		.38		Mean (Count: 20)
316.5	.6	.5	.53	2.69	.25	.16	3.2	.24	2.8		.20		S.D. (Population)
324.7	.6	.5	.54	2.76	.26	.16	3.3	.25	2.8		.21		S.D. (Sample)

Model, Populn: RMSE .31 Adj (True) S.D. 2.67 Separation 8.49 Strata 11.66 Reliability .99
 Model, Sample: RMSE .31 Adj (True) S.D. 2.74 Separation 8.72 Strata 11.96 Reliability .99
 Model, Fixed (all same) chi-square: 4309.5 d.f.: 19 significance (probability): .00
 Model, Random (normal) chi-square: 18.1 d.f.: 18 significance (probability): .45

Learning Partnership Exam 12/26/2020 2:29:28 PM
 Table 7.3.3 Items Measurement Report (arranged by N).

Total Score	Total Count	Obsvd Average	Fair-M Average Measure	Model S.E.	Infit MnSq ZStd	Outfit MnSq ZStd	Estim. Discrm	Correlation PtMea PtExp	Nu Items
649	633	1.0	1.01	-1.71	.06	1.13 2.6	1.15 2.6	.60 .56 .52	1 Q1a_I
1091	635	1.7	1.79	-3.81	.08	.93 -.9	.76 -3.1	1.17 .57 .58	2 Q1b_C
784	634	1.2	1.26	-2.25	.06	.72 -6.3	.81 -3.5	1.21 .55 .55	3 Q1b_E
312	634	.5	.42	-.31	.07	1.17 2.9	1.26 2.7	.90 .41 .40	4 Q1b_R
382	634	.6	.53	-.64	.07	1.08 1.5	1.20 2.5	.73 .30 .43	5 Q2a_RF
315	634	.5	.42	-.33	.07	1.28 4.6	1.47 4.8	.57 .23 .40	6 Q2a_S
1	634	.0	.00	5.93	1.00	1.00 .3	.44 .1	1.01 .04 .03	7 Q2a_G
459	635	.7	.66	-.96	.06	.78 -4.8	.83 -2.6	1.20 .47 .46	8 Q2bc_RF
616	635	1.0	.94	-1.58	.06	.80 -4.6	.84 -2.8	1.18 .50 .51	9 Q2bc_S
4	635	.0	.00	4.54	.50	1.00 .1	.72 .0	1.00 .05 .05	10 Q2bc_G
765	635	1.2	1.22	-2.17	.06	1.15 2.8	1.18 3.1	.71 .62 .55	11 Q3a_I
982	635	1.6	1.62	-3.16	.07	1.04 .6	.89 -1.6	1.18 .66 .58	12 Q3b_C
685	635	1.1	1.07	-1.85	.06	.66 -8.0	.65 -7.3	1.49 .65 .53	13 Q3b_E
228	635	.4	.29	.15	.08	1.04 .6	.93 -.5	1.07 .41 .35	14 Q3b_R
293	635	.5	.39	-.21	.07	1.16 2.7	1.10 1.1	.79 .29 .38	15 Q4a_RF
205	635	.3	.26	.29	.08	1.12 1.8	1.01 .1	.93 .30 .33	16 Q4a_S
7	635	.0	.01	3.98	.38	.99 .1	.68 -.2	1.01 .08 .07	17 Q4a_G
337	634	.5	.46	-.43	.07	1.03 .6	.96 -.4	.94 .37 .41	18 Q4bc_RF
407	634	.6	.57	-.74	.07	.98 -.3	.92 -1.0	1.05 .45 .44	19 Q4bc_S
2	634	.0	.00	5.24	.71	1.00 .2	1.21 .5	.99 .02 .04	20 Q4bc_G
Total Score	Total Count	Obsvd Average	Fair-M Average Measure	Model S.E.	Infit MnSq ZStd	Outfit MnSq ZStd	Estim. Discrm	Correlation PtMea PtExp	Nu Items
426.2	634.5	.7	.65	.00	.18	1.00 -.2	.95 -.3	.38	Mean (Count: 20)
316.5	.6	.5	.53	2.69	.25	.16 3.2	.24 2.8	.20	S.D. (Population)
324.7	.6	.5	.54	2.76	.26	.16 3.3	.25 2.8	.21	S.D. (Sample)
Model, Populn: RMSE .31 Adj (True) S.D. 2.67 Separation 8.49 Strata 11.66 Reliability .99									
Model, Sample: RMSE .31 Adj (True) S.D. 2.74 Separation 8.72 Strata 11.96 Reliability .99									
Model, Fixed (all same) chi-square: 4309.5 d.f.: 19 significance (probability): .00									
Model, Random (normal) chi-square: 18.1 d.f.: 18 significance (probability): .45									

