

TABLE OF CONTENTS

Table of Contents	1
List of Tables	4
List of Figures	7
Acknowledgements	8
Overview of this Manual	9
1. Introduction	11
1.1. Background.....	11
1.2. Rationale for the 2010 Mod-MSA: Mathematics	12
1.3. Eligibility Criteria for the Mod-MSA: Mathematics	12
1.4. Test Administration of the 2010 Mod-MSA: Mathematics.....	12
Test Materials	12
Test Administration Schedule	13
Student Participation	14
Accommodations for Assessment	14
Test Format	15
Security of Test Materials	16
1.5. Quality Control Procedures	16
1.6. Item Bank Construction.....	18
2. Test Design and Development of the 2010 Mod-MSA: Mathematics	19
2.1. Test Design and Structure of the 2010 Mod-MSA: Mathematics	19
2.2. Development and Review of the 2010 Mod-MSA: Mathematics	20
National Psychometric Council.....	21
Content Review Committee	21
Bias Review Committee.....	21
Vision Review Committee	21
2.3. Operational Form Structure of the 2010 Mod-MSA: Mathematics.....	21
2.4. Procedures Undertaken for Item Analyses Prior to the Creation of the Operational Form	23
Classical Item Analyses.....	24
Differential Item Functioning Analyses	24
Item Response Theory (IRT) Analyses	27
2.5. Items Flagged for Inspection Prior to the Creation of the Operational Forms	27
2.6. Items Selected for the 2010 Operational Tests	27
2.7. Scoring Procedures of the 2010 Mod-MSA: Mathematics.....	29
3. Central Tendency Measures and Other Classical Item Analyses of the 2010 Mod-MSA: Mathematics	30
3.1. Measures of Central Tendency	30
Standard Error of the Mean	30
3.2. Item Level Descriptive Statistics	32
4. Scale Creation, Equating and Raw Scores to Scale Scores Conversion via Item Response Theory (IRT) Procedures	51

The Rasch Model	51
4.1. Calibration and Scaling Procedures for Grades 3 to 5.....	53
4.2. Specifics for Creating the Base Scale for the Mod-MSA: Mathematics Grades 3-5.....	53
4.3. Calibration and Equating the 2010 Mod-MSA: Mathematics Grades 6-8	54
4.4. Specifics of Linking and Equating the 2010 Mod-MSA Grades 6-8: Mathematics.....	54
4.5. Reporting Scale Scores for the 2010 Mod-MSA: Mathematics	59
Raw Score to Scale Score Conversion Tables for the Total Score.....	61
Raw Score to Scale Score Conversion Tables for the Subscales	73
4.6. Score Interpretation	85
Scale Scores.....	85
Performance Level Descriptors	85
4.7. Final Performance Level Cut Points for the Mod-MSA: Mathematics.....	85
5. Comparative Classical and IRT Stats Across Years for the Common Items Used in Grades 6-8.87	
6. IRT Item Level Statistics for the 2010 Mod-MSA: Mathematics.....	94
6.1 Rationale for the Use of the Rasch Model.....	94
6.2 Fit Statistics for the Rasch Model.....	94
6.3 Rasch Item Level Statistics.....	95
7. Test Reliability	114
7.1. Precision and Reliability (Classical Methods).....	114
Standard Error of Measurement (SEM) of the Test	114
Cronbach’s Alpha (KR ₂₀).....	115
7.2. IRT Method in Measuring Precision of the Test	115
7.3. Decision Accuracy and Consistency at the Cut Scores	116
8. Test Validity	118
8.1. Test Validity for the 2010 Mod-MSA: Mathematics	118
Content-Related Evidence.....	118
Evidence from Item Development Methods.....	118
Evidence from Internal Structure of the Tests.....	121
8.2. Unidimensionality Analysis for the 2010 Mod-MSA: Mathematics.....	123
9. Summary of Operational Test Results for the 2010 Mod-MSA: Mathematics.....	125
9.1 Classical Descriptive Test Statistics (Raw Scores)	125
9.2 Scale Score Descriptive Statistics.....	125
9.3 Frequency of Students at Each Proficiency Level by Grade	126
9.4. Test Characteristic Curves, Test Information Functions, and Conditional Standard Errors of Measurement.....	127
10. References.....	141
Appendix A: Operational Items Selected After Data Review.....	143
Appendix B: Item Distractor Analyses	150
Appendix C: Frequency Distribution Histograms of Scale Scores.....	169
Appendix D: Standard Setting Report.....	176

Appendix E: Alignment of the 2009 Mod-MSA: Mathematics Items to the State Standards256
Appendix F: Identifying Students for Participation in the Mod-MSA: Mathematics Program263
**Appendix G: Comparability Study of Paper and Pencil, and Online Administration of the Mod-MSA
.....265**