

Assessment 1 (Licensure assessment or other content-based assessment aligned to NCTM NCATE Mathematics Content for Secondary, required): Content Specialty Test (CST)

1. Narrative

All candidates who wish to earn an initial teaching certificate in Adolescent Education: Mathematics or in Middle Childhood Education: Mathematics must take the Content Specialty Test (CST) for secondary mathematics. Candidates in both programs take the same CST. It is important for the reader to know that we encourage candidates to take the CST as soon as they complete their mathematics content courses, but we cannot require successful completion of the CST as part of our program.

1a. CST Overview.

The CST is an examination designed by the New York State Department of Education (NYSED) to assess candidates' knowledge of secondary mathematics. The CST addresses five domains (i.e., mathematical reasoning & communication, algebra, trigonometry & calculus, measurement & geometry, and data analysis, probability, statistics & discrete math). The CST consists of two sections, a multiple-choice test which addresses each of the five domains and a constructed-response test that addresses the algebra domain (http://www.nystce.nesinc.com/PDFs/NY_fld004_prepguide.pdf) . Effective September 2014, NYSED will replace the current CST with a revised CST (http://www.nystce.nesinc.com/NY_annProgramUpdate.asp#TestMaterials). The revised CST will address seven domains (i.e., number and quantity, algebra, functions, calculus, geometry and measurement, statistics and probability, and pedagogical content knowledge). The first five domains will be assessed using selected response questions. The last domain will be assessed by a constructed response item. Although the revised CST does not impact the data being reported in this SPA, it is included in Table 1 as a point of information and reference for future SPA reports. In the revised CST, competency A.1.2 in the Number and Quantity domain, and competencies A.6.2, A.6.3, and A.6.4 in the Discrete Mathematics domain will not be addressed.

1b. Alignment between the NCTM CAEP 2012 Content Standards and the CST¹

Table 1. Alignment between the NCTM CAEP 2012 Content Standards and the Current CST and the Revised CST (Sources: For current CST and revised CST <http://www.nctm.org/standards/content.aspx?id=2978>.)

¹ In September 2014, candidates will be taking a CST based upon a new testing framework (http://www.nystce.nesinc.com/NY_PM.asp?t=004).

Mathematical Domain	Competencies Addressed in the Current CST	% Alignment	Competencies Addressed in the Revised CST	% Alignment
A.1 Number & Quantity	A.1.1, A.1.2, A.1.3, A.1.4	80%	A.1.1, A.1.3.A.1.4	60%
A.2 Algebra	A.2.1, A.2.2, A.2.3, A.2.4, A.2.6	~71%	A.2.1, A.2.2, A.2.3, A.2.4, A.2.6	~71%
A.3 Geometry & Trigonometry	A.3.1, A.3.2, A.3.3, A.3.4, A.3.5, A.3.6, A.3.8, A.3.9	80%	A.3.1, A.3.2, A.3.3, A.3.4, A.3.5, A.3.6, A.3.8, A.3.9	80%
A.4 Statistics & Probability	A.4.3, A.4.4, A.4.5	50%	A.4.3, A.4.4, A.4.5	50%
A.5 Calculus	A.5.1, A.5.3, A.5.5	50%	A.5.1, A.5.3, A.5.5	50%
A.6 Discrete Math	A.6.2, A.6.3, A.6.4	60%	None	0%

1c. Brief Analysis of data findings.

Included in this report are data for 27 undergraduate program completers for three years. Only one of the 27 candidates completed our Middle Childhood Education program. Our overall passing rate for the Adolescent Education program completers over the three years is approximately 92.6% (see Table 2). All but two candidates earned a score of at least 220, the minimum score identified by NYSED as passing. Although NYSED does not specify a minimum passing score for the subareas of the CST, we used 220 as our reference for closer examination of the data. Our candidates collectively need additional support in subarea 6. Sixteen out of 27 candidates (as indicated by the shaded cells in Table 2) scored below 220. Several candidates struggle in subareas 4 and 5 (as indicated by the shaded cells), although the averages for each of the three academic years are over 220 (see Table 3). With only one Middle Childhood Education program completer, no course- or program-level analysis is possible.

1d. Interpretation of data.

Given that we are not given copies of the candidates' work for the constructed response problem, we can only hypothesize what factors contributed to the low scores. According to the test framework, the constructed-response problem is an algebra problem for which candidates' responses are evaluated upon three criteria: purpose, application of content, and support (NYSTCE, Test preparation guide: Mathematics CST [04], 2006, p. 42). The data show that our candidates do very well in the algebra domain in the multiple-choice section. The average score for all program completers in the algebra subarea was approximately 272.33 out of 300, the highest average score on the CST. We, therefore, hypothesize that our candidates need more support fulfilling the demands of communicating the mathematical reasoning that lead to their respective solutions/answer, and demonstrating their understandings of the mathematics relevant to the problem.

Several candidates struggled in subareas 4 and 5. However, over the 3 years fewer candidates seem to be struggling (4 out of 8 in 2011 – 2012; 3 out of 10 in 2012 – 2013; and 2 out of 8 in 2013 – 2014).

2. Assessment Documentation

2e. Assessment description.

The current CST consists of six subareas. Five subareas (i.e., mathematical reasoning & communication, algebra, trigonometry & calculus, measurement & geometry, and data analysis) are assessed using multiple-choice questions and one subarea (i.e., algebra) is also assessed using a constructed-response item. There is a maximum possible score of 300 each subarea. The overall score is a weighted score for which passing is 220 out of 300. There is no minimum score required to pass the subareas.

2f. Scoring guide.

The NYSED does not provide a scoring guide for the multiple-choice sections of the CST. NYSED does identify assessment criteria (NYSTCE, Test preparation guide, 2006, p. 46) for the constructed-response test.

Assessment Criteria:

- Purpose: Fulfill the charge of the assignment
- Application of Content: Accurately and effectively apply the relevant knowledge and skills.
- Support: Support the response with appropriate examples and/or sound reasoning reflecting an understanding of the relevant knowledge and skills.

How the scores (0 to 300) are determined for the multiple choice test and the constructed-response test is not specified.

2g. Candidate data derived from Assessment 1.

Table 2a. CST Exam Data for Adolescence Education Program Completers (Note: The minimum overall passing score is 220.)

Candi- date	Grad. Semester	Status	Total Score	Subarea 1	Subarea 2	Subarea 3	Subarea 4	Subarea 5	Subarea 6	
1	Fa 2011	P	264	283	265	273	260	220	300	<p><u>Multiple-Choice Test</u></p> <p>Subarea 1: Mathematical reasoning & communication</p> <p>Subarea 2: Algebra</p> <p>Subarea 3: Trigonometry & calculus</p> <p>Subarea 4: Measurement & geometry</p> <p>Subarea 5: Data analysis, probability, statistics & discrete math</p> <p><u>Constructed-Response Test</u></p> <p>Subarea 6: Algebra</p>
2	Fa 2011	P	246	203	266	261	261	248	193	
3	Fa 2011	P	241	267	274	220	273	220	140	
4	Fa 2011	P	235	252	258	222	197	248	220	
5	Sp 2012	P	231	252	258	222	209	209	220	
6	Sp 2012	F	205	203	224	235	171	222	140	
7	Sp 2012	P	278	267	291	273	260	273	300	
8	Sp 2012	P	224	235	283	209	184	197	193	
9	Fa 2012	P	228	233	265	247	233	180	167	
10	Fa 2012	P	280	283	300	273	287	300	193	
11	Fa 2012	P	265	235	283	287	248	248	273	
12	Fa 2012	P	280	268	283	300	274	261	300	
13	Fa 2012	P	240	235	266	287	235	222	140	
14	Sp 2013	P	237	284	275	222	197	209	220	
15	Sp 2013	P	227	300	249	222	184	235	140	
16	Sp 2013	P	284	300	300	287	274	274	247	
17	Sp 2013	P	275	300	283	300	287	287	140	
18	Sp 2013	P	223	233	257	220	233	207	140	
19	Fa 2013	P	270	268	292	274	261	274	220	
20	Fa 2013	P	247	252	275	261	248	248	140	
21	Fa 2013	P	256	252	275	274	222	222	300	
22	Fa 2013	F	0	300	300	261	248	209	0	
23	W 2014	P	240	268	283	248	222	222	140	
24	Sp 2014	P	258	252	283	261	248	235	247	
25	Sp 2014	P	250	235	275	274	222	274	167	
26	Sp 2014	P	229	268	249	261	209	209	140	
# of scores < 220:			2	2	0	1	7	7	15	
Average Scores :			238.96	258.77	273.54	256.69	236.42	236.65	193.08	
% Pass Rate (for n = 26): 92.30										

[Note: The shaded cells highlight average scores less than 220.]

Table 2b. CST Exam Data for Middle Childhood Program Completers (Note: The minimum overall passing score is 220.)

Candidate	Grad. Semester	Status	Total Score	Subarea 1	Subarea 2	Subarea 3	Subarea 4	Subarea 5	Subarea 6	Subareas for this data are the same as those identified in Table 2a.
1	Sp 2012	P	225	284	241	222	235	197	140	
# of scores < 220:			0	0	0	0	0	1	1	
Average:			225	284	241	222	235	197	140	
% Pass Rate (for n = 1):			100							

[Note: The shaded cells highlight average scores less than 220.]

Table 3. Trends in Adolescence Education: Mathematics, Grades 7 – 12 Candidates’ CST Average Scores

	N	Overall Score	Subarea 1	Subarea 2	Subarea 3	Subarea 4	Subarea 5	Subarea 6
2011 – 2012	■	240.50.6	245.25	264.88	239.38	226.88	229.63	213.25
2012 – 2013	10	253.90	267.10	276.10	264.50	245.20	242.30	196.00
2013 - 2014	■	218.75	261.88	279.00	264.25	235.00	236.63	169.25

[Note: The shaded cells highlight average scores less than 220.]

Multiple-Choice Test

Subarea 1: Mathematical reasoning & communication

Subarea 2: Algebra

Subarea 3: Trigonometry & calculus

Subarea 4: Measurement & geometry

Subarea 5: Data analysis, probability, statistics & discrete math

Constructed-Response Test

Subarea 6: Algebra

Given that we only have one candidate who completed the Middle Childhood Education: Mathematics, Grades 5 – 9 Program. It does not make sense to examine the data for trends.