



# CREDIT BY EXAMINATION ANALYSIS

Prepared for Frisco Independent School District

May 2020



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# INTRODUCTION

The Texas State Board of Education (SBOE) implemented new rules, effective August 2018, requiring school districts to provide annual reports on the validity of exams offered to students for acceleration.

Frisco Independent School District (Frisco ISD) partnered with Hanover Research (Hanover), a third-party research firm, to analyze results from Credit by Examination (CBE) assessments for Math 6, Math 7, Math 8, and Geometry. This analysis complies with part three of the state regulation which states:<sup>1</sup>

- (3) A school district or the provider of the assessment must make public an annual report, including:
  - (A) the test development process;
  - (B) a statement certifying that the examination meets the criteria in paragraph (2)(D) of this subsection;
  - (C) the number of students who took each examination;
  - (D) the number of students who scored 70% or above on each examination;
  - (E) the number of students who scored 80% or above on each examination; and
  - (F) the average score for all students who took the examination for each examination.

In order to satisfy the requirements in paragraphs (3)(A) and (3)(B), Hanover summarizes background information on test development and testing processes completed by Frisco ISD and Region 10 Education Service Center (Region 10 ESC). A description of this work appears in Section I and the relevant documentation appears in the Appendix. Pursuant to paragraphs (3)(C) through (3)(F), Hanover analyzes data supplied by Frisco ISD from CBE assessments for Math 6, Math 7, Math 8, and Geometry from the 2016-2017 through 2018-2019 school years. The results of this analysis appear in Section II of this report. Finally, in Section III, Hanover conducts an analysis comparing the outcomes for Forms A and D.

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<sup>1</sup>19 Tex. Admin. Code §74.24 (2018).

# SECTION I: EXAM FOR ACCELERATION TEST DEVELOPMENT PROCESS

In this section, Hanover highlights the relevant aspects of the test development process, including confidentiality, Texas Essential Knowledge and Skills (TEKS) alignment, and test and item validation.

## TEST DESIGN/DEVELOPMENT PROCESS

The primary purpose of Frisco ISD's CBE program is to provide students the opportunity to demonstrate mastery of grade level material for the purpose of acceleration without prior instruction. Exams are constructed and aligned to the TEKS. Exams are kept confidential and administered strictly by contracted Frisco ISD staff under the supervision of Frisco ISD's Assessment and Accountability Department.<sup>2</sup>

## DESIGN COMPONENTS

Each Frisco ISD CBE exam is developed using a subject-specific TEKS blueprint to ensure 100% TEKS alignment. Frisco ISD also ensures the number of items for each standard reflects the intent of the course by referencing state designated readiness and supporting standards as well as identified Critical Focal Points. These blueprint documents were used and referenced by exam writers throughout the development process as well as by Region 10 ESC reviewers.

## TEST AND ITEM SPECIFICATIONS

Each Frisco ISD subject-specific TEKS blueprint was developed by the Frisco ISD Secondary Mathematics Curriculum Team to ensure exams would cover 100% of the state-identified testable TEKS at the level of rigor to which each Student Expectation (SE) is written. By the nature of the verbs within the SEs, the curriculum team assessed the state's intended level of cognition and wrote items to match both content and verb.

Region 10 ESC reviewers ensured technical quality and exam alignment of content and rigor by analyzing item alignment to adopted 2012 Math TEKS, clarity of language and vocabulary, answer choice accuracy/possible ambiguity, clarity of image and text in each item, and the amount of time needed to work through the exam given the same tools students would have available to them.

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<sup>2</sup> See Appendix I for more details on security and confidentiality.

## SECTION II: ANNUAL STATISTICS

One of the goals of this report is to summarize student performance on the CBE exams.<sup>3</sup> Hanover used data from Frisco ISD to generate the following reports on student performance, separated out by subject, school year, and semester.<sup>4</sup>

For each subject, we report two tables. The first table includes the number of students who took the exam for acceleration in each school year, along with the average scores by semester. For the 2016-2017 and 2018-2019 school years the data were split by semester except for Geometry; therefore, each student appears in the dataset twice for each of Math 6, Math 7, and Math 8, and the same group of students appears for Semester 1 as for Semester 2. There was no semester indicator for the 2018-2019 data. The second table reports the number of students who scored at least 70% or at least 80%, along with the proportion of test-takers that number represents. These numbers are also disaggregated by school year and semester for all but Geometry for the 2016-2017 and 2017-2018 school years. In each subsection, Hanover provides key findings for the exam, followed by the two summary tables.

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<sup>3</sup> See Appendix III for more information on the original datasets Frisco provided Hanover and the methodology Hanover used to structure the data and generate the reports.

<sup>4</sup> Note, the Geometry exam data was not broken out by semester in 2016-17 and 2017-18, so in this report we disaggregate the Geometry data by school year only. This is also the case for all subjects in 2018-19.

## MATH 6

### Key Findings

- The number of students who took the Math 6 exam for acceleration more than doubled from 124 to 340 between the 2016-2017 and 2018-2019 school years. This increase plateaued by the 2018-2019 school year, with 389 CBE test takers for Math 6.
- Average scores stayed about the same across the 2016-2017 and 2017-2018 school years. However, Semester 2 scores were lower than Semester 1 scores in both school years. Scores in the 2018-2019 year are slightly higher compared to Semester 2 and lower compared to Semester 1 in prior years, but this may be due to the lack of a semester indicator.
- There was a decline in the proportion of students who scored at least 70% or at least 80% from Semester 1 to Semester 2 in both the 2016-2017 and 2017-2018 school years. In 2018-2019, where there is no semester distinction, the averages fall between the Semester 1 and Semester 2 values for 2016-2017 and 2017-2018.

**Figure 2.1: Math 6 – Average Scores**

SCHOOL YEAR	NUMBER	AVERAGE SCORE		Year
		Semester 1	Semester 2	
2016-17	124	79.44%	71.68%	--
2017-18	340	76.82%	71.22%	--
2018-19	389	--	--	73.23%

**Figure 2.2: Math 6 – High Performance**

SEMESTER	SCORED 70% OR ABOVE		SCORED 80% OR ABOVE	
	Number	Proportion	Number	Proportion
<b>2016-17</b>				
1	98	79.03%	75	60.48%
2	75	60.48%	42	33.87%
<b>2017-18</b>				
1	260	76.47%	172	50.59%
2	200	58.82%	105	30.88%
<b>2018-19</b>				
--	250	64.27%	152	39.07%

## MATH 7

### Key Findings

- The number of students who took the Math 7 exam for acceleration has increased over time. While the increase was small between the 2016-2017 and 2017-2018 school years, this increase was substantially larger between the 2017-2018 and 2018-2019 school years.
- Average scores stayed about the same across the 2016-2017 and 2017-2018 school years. However, Semester 2 scores were significantly lower than Semester 1 scores in both school years. Scores in the 2018-2019 year were slightly higher compared to Semester 2 and lower compared to Semester 1 of prior years, but this may be due to the lack of a semester indicator.
- There was a decline in the proportion of students who scored at least 70% or at least 80% from Semester 1 to Semester 2 in the 2016-2017 and 2017-2018 school years. In 2018-2019 where there is no semester distinction, the averages fall between the Semester 1 and Semester 2 values for 2016-2017 and 2017-2018.

Figure 2.3: Math 7 – Average Scores

SCHOOL YEAR	NUMBER	AVERAGE SCORE		Year
		Semester 1	Semester 2	
2016-17	108	75.51%	61.54%	--
2017-18	129	77.44%	62.24%	--
2018-19	176	--	--	67.58%

Figure 2.4: Math 7 – High Performance

SEMESTER	SCORED 70% OR ABOVE		SCORED 80% OR ABOVE	
	Number	Proportion	Number	Proportion
<b>2016-17</b>				
1	76	70.37%	60	55.56%
2	43	39.81%	16	14.81%
<b>2017-18</b>				
1	92	71.32%	69	53.49%
2	53	41.09%	23	17.83%
<b>2018-19</b>				
--	76	43.18%	46	26.14%

## MATH 8

### Key Findings

- The number of students who took the Math 8 exam for acceleration has consistently increased over the past three years. Specifically, the number of students participating rose from 37 students in the 2016-2017 school year to 139 students in 2018-2019 school year.
- Average scores dropped from 2016-2017 to 2017-2018. However, they were about the same across semesters within each school year. Scores in the 2018-2019 year are slightly higher than in both semesters of 2017-2018 and slightly lower than in both semesters of 2016-2017.
- The proportion of students who scored at least 70% or at least 80% declined between the 2016-2017 and 2017-2018 school years, but they remained consistent across semesters within each school year. In 2018-2019, where there is no semester distinction, the average rebounded slightly.

Figure 2.5: Math 8 – Average Scores

SCHOOL YEAR	NUMBER	AVERAGE SCORE		Year
		Semester 1	Semester 2	
2016-17	37	68.86%	68.59%	--
2017-18	81	60.09%	59.70%	--
2018-19	139	--	--	63.76%

Figure 2.6: Math 8 – High Performance

SEMESTER	SCORED 70% OR ABOVE		SCORED 80% OR ABOVE	
	Number	Proportion	Number	Proportion
<b>2016-17</b>				
1	22	59.46%	13	35.14%
2	20	54.05%	15	40.54%
<b>2017-18</b>				
1	23	28.40%	20	24.69%
2	28	34.57%	19	23.46%
<b>2018-19</b>				
--	60	43.17%	40	28.78%



# GEOMETRY

## Key Findings

- The number of students who took the Geometry exam for acceleration more than tripled from 49 to 165 between the 2016-2017 and 2017-2018 school years. The increase in students between the 2017-2018 and 2018-2019 school years was much more modest with an increase of 41 students.
- Average scores have remained consistent over all three years. While the proportions of students who scored at least 70% or at least 80% has slightly increased over time.

**Figure 2.5: Geometry – Average Scores**

SCHOOL YEAR	NUMBER	AVERAGE SCORE
2016-17	49	69.16%
2017-18	165	68.87%
2018-19	206	70.07%

**Figure 2.6: Geometry – High Performance**

SEMESTER	SCORED 70% OR ABOVE		SCORED 80% OR ABOVE	
	Number	Proportion	Number	Proportion
<b>2016-17</b>				
--	24	48.98%	13	26.53%
<b>2017-18</b>				
--	83	50.30%	51	30.91%
<b>2018-19</b>				
--	119	57.77%	69	33.50%

## SECTION III: FORM COMPARISON

There were two forms (Form A and Form D) of the examination administered for Math 6, Math 8, and Geometry in the 2017-2018 school year, and for all four subjects in the 2018-2019 school year. Though different, these forms are expected to test the same set of knowledge. Therefore, results of the two forms should be comparable to each other.

Below we compare the results for Forms A and D. The table reports the average score by each form and provides the difference between the two scores, as well as an indicator for whether the difference is statistically significant.<sup>5</sup>

### Key Findings

- The difference between the average score for students who took Form A and the average score for students who took Form D is statistically significant for all three subjects for the 2017-2018 school year. Students who took Form A have a higher average for Math 8 and Geometry, but a lower average for Math 6.
- Math 8 and Geometry have statistically significant differences between Form A and Form D student averages with Form A having the higher student average for both.
- There are five instances of a statistical difference between student averages on Form A and Form D. Students taking Form A have higher averages for four of the five instances.

**Figure 3.1: Comparison of Average Scores between Forms**

SUBJECTS	AVG. SCORE (A)	TOTAL N (A)	AVG. SCORE (D)	TOTAL N (D)	DIFFERENCE
<b>2017-18</b>					
Math 6	72.25%	270	75.19%	410	-2.94%***
Math 7	--	--	--	--	--
Math 8	68.72%	80	51.28%	82	17.44%***
Geometry	73.60%	73	65.11%	92	8.49%***
<b>2018-19</b>					
Math 6	72.91%	101	73.35%	288	-0.44%
Math 7	67.07%	88	68.09%	88	-1.02%
Math 8	69.63%	52	60.24%	87	9.39%***
Geometry	72.34%	105	67.71%	101	4.63%**

The "Difference" column describes the percentage-point difference between the average scores from students who took Form A versus Form (i.e., Form A average score – Form D average score). \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

<sup>5</sup> To identify whether the difference between the average score for form A and the average score for form D is significant, we conducted a two-sample t-test of means.

# APPENDIX I: SECURITY AND CONFIDENTIALITY OF FRISCO ISD CBE ASSESSMENTS

Frisco ISD employs specific procedures to maintain the security and confidentiality of CBE assessments. Here, Hanover provides two resources available to campus coordinators and test administrators detailing the appropriate procedures.

## CAMPUS COORDINATOR AND ADMINISTRATION

Procedures for maintaining the security and confidentiality of district CBE assessments are specified below. Conduct that violates the security and confidentiality of a test is defined as any departure from the test administration procedures established in this document and other test administration materials. Conduct of this nature may include the following acts and omissions:

- Viewing a test before, during, or after an assessment unless specifically authorized to do so;
- Duplicating secure examination materials;
- Disclosing the contents of any portion of a secure test;
- Providing, suggesting, or indicating to an examinee a response or answer to a secure test item or prompt;
- Changing or altering a response or answer of an examinee to a secure test item or prompt;
- Encouraging or assisting an individual to engage in the conduct described in items 1-5 listed above; or
- Failing to report to an appropriate authority that an individual has engaged in conduct outlined in the items listed above.

## MONITORING AND OVERSIGHT

- Campus testing coordinators must check to see if test administrators have all necessary materials (e.g., test booklets, answer documents, formula charts).
- Campus administration and coordinators must verify that test administrators are actively monitoring students.
- Testing personnel should verify that all testing areas are free from instructional displays. (In situations where the campus must relocate examinees, the area to which the students will be moved should also be checked.)
- Students should be monitored properly during breaks.
- Campus administration and coordinators must verify that test administrators are properly completing a seating chart for each test session. Make sure seating charts include any students who moved, transferred, or arrived late to a test session.
- Test administrators must monitor the testing time and be communicating the time-left-to-test in one hour intervals and, if desired, in shorter intervals during the last hour. For students testing in four, 45-minute class period, test administrators should communicate

the amount of time-left-to-test in 15-minute intervals and, if desired, in shorter intervals during the last 15-minutes.

- For breaks that require the time clock to be stopped, ensure that test administrators are recording the stop and restart times on the seating chart.
- All test administrators are required to ensure that students have marked their responses on their answer documents before the end of the three-hour time period.
- The campus administration and test coordinator are available to support test administrators as needed.

## PROCEDURES FOR SECURE MATERIALS HANDLING

- Campus coordinators should correctly use Materials Control Forms when distributing test materials to test administrators each day. Require the use of tracking document to record overage, additional materials received, or booklets transferred between campuses.
- Campuses are to follow proper check-in/check-out procedures and use materials control documents.
- Campus coordinators and test administrators should ensure that test booklets are properly secured or monitored while students are taking breaks.
- Campus coordinators must verify that all booklets are being returned and accounted for each day.
- Campus must lock and restrict access to the secure storage area.

## TEST ADMINISTRATOR

Procedures for maintaining the security and confidentiality of district CBE assessments are specified below. Conduct that violates the security and confidentiality of a test is defined as any departure from the test administration procedures established in this document and other test administration materials. Conduct of this nature may include the following acts and omissions:

- Viewing a test before, during, or after an assessment unless specifically authorized to do so;
- Duplicating secure examination materials;
- Disclosing the contents of any portion of a secure test;
- Providing, suggesting, or indicating to an examinee a response or answer to a secure test item or prompt;
- Changing or altering a response or answer of an examinee to a secure test item or prompt;
- Encouraging or assisting an individual to engage in the conduct described in items 1-5 listed above; or
- Failing to report to an appropriate authority that an individual has engaged in conduct outlined in the items listed above.

## MONITORING AND OVERSIGHT

- Test administrators must actively monitor students.
- Testing personnel should verify that all testing areas are free from instructional displays. (In situations where the campus must relocate examinees, the area to which the students will be moved should also be checked.)
- Students should be monitored properly during breaks.
- Test administrators should properly complete a seating chart for each test session. Make sure seating charts include any students who moved, transferred, or arrived late to a test session.
- Test administrators must monitor the testing time and be communicating the time-left-to-test in one hour intervals and, if desired, in shorter intervals during the last hour. For students testing in four, 45-minute class period, test administrators should communicate the amount of time-left-to-test in 15-minute intervals and, if desired, in shorter intervals during the last 15-minutes.
- For breaks that require the time clock to be stopped, ensure that test administrators should record the stop and restart times on the seating chart.
- All test administrators are required to ensure that students have marked their responses on their answer documents before the end of the three-hour time period.

## PROCEDURES FOR SECURE MATERIALS HANDLING

- Campuses are to follow proper check-in/check-out procedures and use materials control documents.

- Campus coordinators and test administrators should ensure that test booklets are properly secured or monitored while students are taking breaks.
- Campus coordinators must verify that all booklets are being returned and accounted for each day.
- Campus must lock and restrict access to the secure storage area.

# OATH OF TEST SECURITY AND CONFIDENTIALITY FOR TEST ADMINISTRATOR

**For ALL Test Administrators:** Complete this section **before** handling any secure test materials

I do hereby certify, warrant, and affirm that I will fully comply with all requirements governing the FISD CBE program and do hereby certify the following by initialing to the left of the statements below and including the date where applicable:

## Initials

\_\_\_ I have received training on test administration procedures, and I understand my responsibilities concerning the administration of local CBEs;

\_\_\_ I am aware that testing procedures require me to actively monitor during test administrations;

\_\_\_ I have read and understand my responsibilities as a test administrator and my obligations concerning the security and confidentiality of FISD CBEs as outlined in the "Security and Confidentiality of FISD CBE Assessments - Test Administrator" document. I am aware of the range of implications that may result from a departure from the documented test administration procedures;

\_\_\_ I am aware of my obligation to report any suspected violations of test security or confidentiality to the campus testing coordinator.

I do hereby further certify, warrant, and affirm that I will faithfully and fully comply with all requirements concerning test security and confidentiality.

Signed on this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
Signature of Test Administrator      Printed Name of Test Administrator

\_\_\_\_\_  
Campus Name

## APPENDIX II: TEST AND ITEM VALIDATION

Frisco partnered with Region 10 ESC to perform the test and item validation for all four assessments referred to in this report.

Region 10 ESC is one of twenty regional education service centers operating in Texas since 1967 under the authority of the SBOE. These service centers are designed to be service organizations and have no regulatory authority. Since 1997, the ESCs have been mandated to help school districts improve student performance and operate more efficiently.<sup>6</sup>

This appendix contains two documents from Region 10 ESC. The first provides the required validation for the CBE assessments for Math 6, Math 7, and Math 8. The second document provides the required validation for the CBE assessment for Geometry.

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<sup>6</sup> "Education Service Centers." Texas Education Agency.  
[https://tea.texas.gov/About\\_TEA/Other\\_Services/Education\\_Service\\_Centers/](https://tea.texas.gov/About_TEA/Other_Services/Education_Service_Centers/)



## CBE EXAM VALIDATION: MATH 6, MATH 7, AND MATH 8



January 26, 2015

To Whom it May Concern:

At the request of Ms. Elliot and Ms. McCord, I performed the following review of the 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> Grade Mathematics Exams for Acceleration for both Semester 1 and Semester 2. My review included the following analyzes:

1. The time it took for me to work through each exam with the same tools students would have available to them
2. Clarity of images and text in each item
3. Clarity of language and vocabulary in each item
4. Possible ambiguity in answer choices
5. Accuracy of answer choice
6. Alignment of item to Adopted 2012 Math TEKS

In addition, I spent a few hours with Ms. Elliot and Ms. McCord reviewing any questions or concerns I found in my analysis. During this session, we discussed and determined solutions for any concerns I had identified. With the changes we discussed, the Semester 1 and Semester 2 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> Grade Mathematics Exams for Acceleration are accurate and reflect the rigor and content of the Adopted 2012 TEKS to the best of my knowledge.

A handwritten signature in black ink that reads 'Bianca Coker'.

Bianca Coker

Mathematics Consultant

Region 10 Education Service Center

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March 1, 2017

To whom it may concern:

On behalf of Region 10 Education Service Center, I have reviewed Frisco ISD's Exam for Acceleration for the high school course of Geometry.

All student expectations are present in the assessment I reviewed and the assessment appears to be equivalent to state level end-of-course assessment instruments in terms of content coverage, item difficulty, and technical quality.

Sincerely,

A handwritten signature in black ink that reads 'Julie Frizzell'.

Julie Frizzell  
Consultant of Teaching & Learning  
Secondary Mathematics

## APPENDIX III: DATA AND METHODOLOGY

Frisco provided Hanover with student raw scores and percent scores on the CBE exams from 2016-2017 to 2018-2019. These datasets were separated by exam form (Form A vs. Form D), school year, and subject.

There were some observations that were missing data in the 2016-2017 and 2017-2018 files. Based on guidance from Frisco, Hanover dropped any students for whom we did not have data for both semesters in Math 6, Math 7, and Math 8. Next, we restructured the data so that each student in Math 6, Math 7, and Math 8 corresponded to two observations: one for Semester 1 and one for Semester 2. This restructuring was not necessary for Geometry because there was no separation by semester in the Geometry data, as well as all subjects in 2018-2019. We then generated binary variables indicating whether the student scored at least 70% and whether the student scored at least 80%. We calculated summary statistics for each course by school year and semester to generate the first table in each subsection of Section II, and then conditional on school year, semester, and the two binary variables representing higher performance (at least 70% or at least 80%) to construct the second table in each subsection of Section II. Finally, we disaggregated the data by form type (A or D) for all years and subjects in which form A and D were administered. We then performed a two-sample t-test of means to identify whether the averages were significantly different in Section III.

# ABOUT HANOVER RESEARCH

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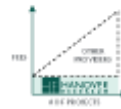
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