

# North Carolina End-of-Grade Test—Grade 8 Mathematics

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*What is the Grade 8 test like?* The North Carolina End-of-Grade (EOG)—Grade 8 test in mathematics assesses the eighth grade goals and objectives in the *North Carolina Mathematics Standard Course of Study* (adopted in May 1998). On the test, students are expected to demonstrate knowledge of important principles and concepts, and relate mathematical information to everyday situations. In order to align with the mathematics curriculum’s focus on inquiry instruction and higher-order thinking, the EOG—Grade 8 test in mathematics has an increased focus on processing information and higher-order thinking.

Each item on the EOG—Grade 8 test in mathematics is related to one of the eighth grade competency goals in the *North Carolina Mathematics Standard Course of Study*. The four competency goals for the grade 8 mathematics curriculum describe the knowledge and skills that are to be taught in all eighth grade classes in North Carolina and provide the basis for the content of the items on the test. Many of the items on the EOG—Grade 8 test in mathematics assess whether a student can move beyond memorization and apply process skills to the investigation of mathematics.

Table 1. Descriptive Information for the North Carolina End-of-Grade Test—Grade 8 Mathematics

Goal	Description of Goal	Percentage of Items on Test
1	The learner will understand and compute with real numbers.	44%
2	The learner will demonstrate an understanding and use of the properties and relationships in geometry, and standard units of metric and customary measurement.	25%
3	The learner will demonstrate an understanding of patterns, relationships, and fundamental algebraic concepts.	15%
4	The learner will demonstrate an understanding and use of graphing, probability, and data analysis.	16%

*How is the test administered?* The EOG—Grade 8 test in mathematics consists of 80 multiple-choice questions and is administered in two parts: Calculator-Inactive (24 questions) and Calculator-Active (56 questions). Students may not use calculators during the Calculator-Inactive part (30%) of the test. Students may use calculators during the Calculator-Active part (70%) of the test. The test is administered during a fixed block of time within the last week (block schedule or summer school) or the last two weeks (traditional schedule) of the school year. Three equivalent forms are administered in each classroom to provide a breadth of information for curriculum evaluation and planning.

*How was the test developed?* The questions on the EOG—Grade 8 test in mathematics were written and reviewed by trained North Carolina teachers and educators during the 1999–2000 and 2000–2001 school years. Mathematics EOG—Grade 8 tests aligned to the *North Carolina Mathematics Standard Course of Study* (adopted in May 1998) were implemented statewide for the first time in the spring of the 2000–2001 school year.

*What kinds of scores do students receive on the test?* The scores on the End-of-Grade Tests in mathematics are reported on a developmental scale, which allows the measurement of growth in achievement across the grade levels. The scale scores range from 210 to 310. The use of scale scores provides for easier and more consistent interpretations of the results from test to test. The use of achievement levels provides an interpretation of student performance relative to a pre-determined standard. The four achievement levels are typically established by linking teacher judgments to the performance distribution of student scores from the field test or the first operational administration of the test.

Table 2. Achievement Levels for North Carolina End of Grade Test—Grade 8  
Mathematics

Level	Description
1	Students performing at this level do not have sufficient mastery of knowledge and skills to be successful at a more advanced level in the content area.
2	Students performing at this level demonstrate inconsistent mastery of knowledge and skills and are minimally prepared to be successful at a more advanced level in the content area.
3	Students performing at this level consistently demonstrate mastery of the subject matter and skills and are well prepared for a more advanced level in the content area.
4	Students performing at this level consistently perform in a superior manner clearly beyond that required to be proficient in the subject matter and skills and are very well prepared for a more advanced level in the content area.

*Sample Items* The following pages contain samples of the types of items that appear on the North Carolina End-of-Grade Test—Grade 8 in mathematics. The objective indicates the curriculum objective the item is designed to assess. The thinking skill corresponds to the level of thinking the item requires as defined by a thinking skills framework adapted from *Dimensions of Thinking* by Robert J. Marzano and others.

*For additional information:* **Assessment Briefs:**  
<http://www.ncpublicschools.org/accountability/testing/briefs/MathematicsScs/>  
<http://www.ncpublicschools.org/accountability/testing/briefs/CalculatorRequirements/>

**Mathematics Curriculum:**  
<http://www.ncpublicschools.org/curriculum>

**Thinking Skills:**  
<http://www.ncpublicschools.org/accountability/testing/>

**Additional Mathematics Sample Items:**  
<http://www.ncpublicschools.org/accountability/testing/eog/>

## Grade 8 Math Sample Items

### Calculator Inactive

1. Objective: 1.02  
Thinking Skill: Applying

Steve currently pays \$450 per month for an apartment. The landlord intends to raise the rent 4% at the end of the year. What can Steve expect to pay per month next year to rent the same apartment?

- \*A \$468.00
- B \$454.00
- C \$451.80
- D \$450.18

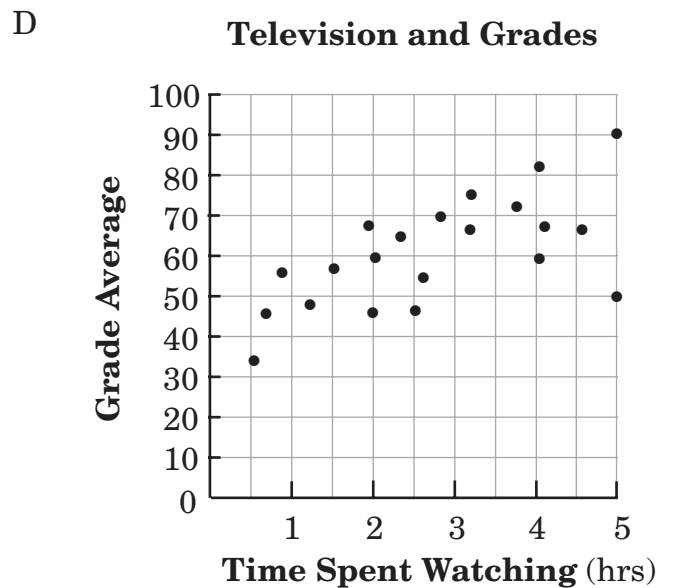
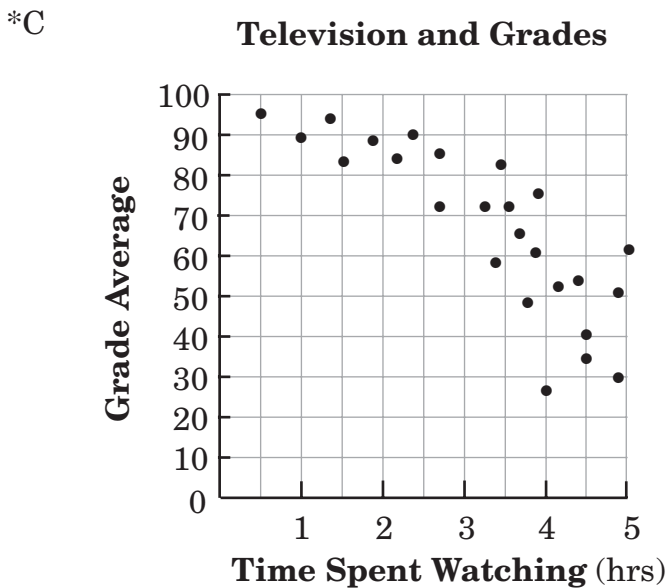
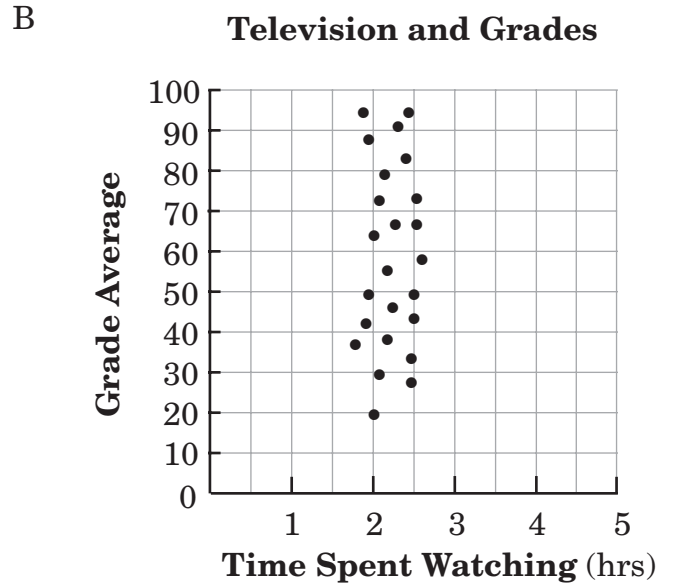
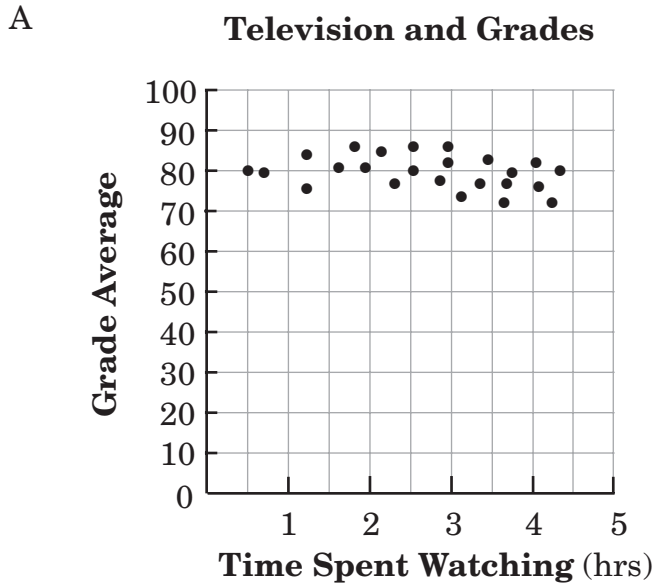
2. Objective: 1.06  
Thinking Skill: Applying

What is the product of  $(3x)^2$  and  $2x^5$ ?

- A  $18x^{10}$
- \* B  $18x^7$
- C  $6x^{10}$
- D  $6x^7$

3. Objective: 4.02  
Thinking Skill: Analyzing

Data concerning the number of hours of television watched and grade averages were gathered from 25 students. Which scatter plot shows a strong negative relationship between the time a student watched television and his/her grade average?



## Calculator Active

4. Objective: 1.10  
Thinking Skill: Analyzing

Which of the following illustrates the use of the commutative property of addition?

A  $(4x + 6y) + 2z = 4x + (6y + 2z)$

B  $(4x + 6y) + 2z = (4x + 6y + 2z)$

\*C  $(4x + 6y) + 2z = (6y + 4x) + 2z$

D  $(4x + 6y) + 2z = (4x + 6y) + 2z$

5. Objective: 1.12  
Thinking Skill: Analyzing

Which of the following pieces of information should have been included in order to solve the problem in the box?

A passenger train travels 70 miles per hour from Chicago to New York. A freight train, traveling 50 miles per hour, travels the same route. How far apart are the cities of Chicago and New York?

- \*A The freight train will take three hours longer to travel the route.
- B The passenger train will make five stops between Chicago and New York.
- C The freight train will carry 2 tons of cargo.
- D The passenger train will carry 500 passengers.

6. Objective: 1.12  
Thinking Skill: Applying

A soccer team won two of its first twelve games. The team ended the season winning exactly half of the games it played. What is the fewest number of games the team could have played?

A 14

\*B 20

C 24

D 28

7. Objective: 2.01  
Thinking Skill: Applying

Mark wants to paint the four walls of his bedroom. His bedroom is 18 feet long, 12 feet wide, and 8 feet high. If a gallon of paint covers 400 square feet, how many gallons of paint will he need to buy?

A 1 gallon

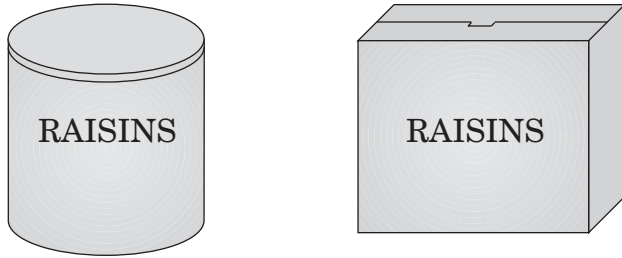
\*B 2 gallons

C 3 gallons

D 4 gallons

8. Objective: 2.05  
Thinking Skill: Applying

Raisins come in two different shaped containers, both having the same height. The cylindrical container measures 10 cm across, while the prism-shaped box has a rectangular top that measures 14 cm by 5 cm.



Which container holds more?

- \*A The cylinder holds more.
- B The prism hold more.
- C They both hold the same amount.
- D It is impossible to tell without knowing the exact height of the containers.

9. Objective: 4.04  
Thinking Skill: Analyzing

The principal at a middle school wants to know if the community will support a dress code. Which method of random sampling is *best*?

- A using a list of residents and choosing the first 100 people on the list
- B splitting a list of residents into seventh-grade parents and eighth-grade parents and selecting the first 10 names on each list
- C choosing children who are attending the middle school
- \*D choosing 100 people from various parts of the community

10. Objective: 4.06  
Thinking Skill: Applying

There are 12 letters in the Hawaiian alphabet: A, E, H, I, K, L, M, N, O, P, U, and W. Each of the letters is written on a separate card and the cards are put into a box. If vowels are A, E, I, O, U and consonants are all other letters, what is the probability of drawing a card with a consonant written on it?

- \*A  $\frac{7}{12}$
- B  $\frac{5}{12}$
- C  $\frac{1}{5}$
- D  $\frac{1}{12}$