

Grade 8 Mathematics

EA/CBE Content Study Guide

This Exam for Acceleration/Credit by Exam Study Guide can help you prepare for the exam by giving you an idea of what you need to study, review, and learn. To succeed, you should be thoroughly familiar with the subject matter before you attempt to take the exam.

Every question that appears on the Exam for Acceleration/Credit by Exam is grounded in the knowledge and skills statements and student expectations within the state-mandated standards, the Texas Essential Knowledge and Skills (TEKS). It should be noted that an exam will not test every student expectation. However, it is important that students study and know the entire scope of the TEKS so that they can develop a complete understanding of the content. The EA/CBEs are a global exam grounded in the TEKS and are not designed to be a final exam. **For a specific listing of the knowledge and skills for this grade level and subject area, please reference the TEKS online at <http://www.tea.state.tx.us/teks/>.** Since questions are not taken from any one source, you can prepare by reviewing any of the state-adopted textbooks.

General Introduction

Learning mathematics is essential to finding answers to real-life questions. The study of mathematics helps students think logically, solve problems, and understand spatial relationships. The concepts learned in mathematics courses help students communicate clearly and use logical reasoning to make sense of their world. TEKS instruction in mathematics throughout elementary, middle, and high school should build the foundation necessary for students to succeed in advanced math and science courses and later in their lives and careers.

The mathematics concepts of algebra and geometry are important for life outside the classroom. The six strands identified in the mathematics curriculum for kindergarten through eighth grade contain the foundation skills necessary for high school mathematics courses. In kindergarten through eighth grade, the six assessment objectives are closely aligned with the six strands identified in the TEKS curriculum. For example, in kindergarten through eighth grade mathematics Objective 1, students are to “demonstrate an understanding of numbers, operations, and quantitative reasoning”; in the TEKS curriculum the first strand identified is “numbers, operations, and quantitative reasoning.” This close alignment reflects the important link between the EA/CBE and the TEKS curriculum. In fact, the mathematics tests are based on those TEKS student expectations Texas educators have identified as the most critical to student achievement and progress in mathematics.

The TEKS were developed to provide educators with instructional goals at each grade level. Although some student expectations are not tested, they are nonetheless critical for student understanding and must be included in classroom instruction. For each strand of learning, the mathematics TEKS provide more rigorous expectations as students master skills and progress through the curriculum.

Objective 1

Student should demonstrate an understanding of numbers, operations, and quantitative reasoning.

Students should:

- know that numbers, operations, and quantitative reasoning is critical for the development of mathematical skills
- understand numbers as digits, words, and models
- understand the value of each digit based on its position in a number in order to read and work with numbers
- understand fractional parts of whole numbers and how the value of the fractional part relates to the value of the whole.
- understand specific combinations of numbers as solutions to problems.
- learn to work with and distinguish among the four basic operations of addition, subtraction, multiplication, and division
- develop a sense of the reasonableness of an expected answer. Quantitative reasoning is knowing when an answer makes sense and is one purpose for rounding numbers to estimate. Numbers are also rounded when an exact answer is not required.

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Objective 2

Student should demonstrate an understanding of patterns, relationships, and algebraic reasoning.

Students should:

- understand patterns, relationships, and algebraic thinking as an integral component of the foundation of basic algebra.
- identify relationships using proportions to estimate percents and calculate rates.
- generate, in mathematical terms or verbal descriptions, information from various forms of data to compare and contrast quantities
- communicate results effectively by using graphs and tables in science and social studies and use these skills in monetary situations, including rates of exchange in currency.
- use an algebraic expression to locate any term in a pattern.
- use models, expressions with variables, and simple equations to solve problems.

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Objective 3

Student should demonstrate an understanding of geometry and spatial reasoning.

Students should:

- know that geometry and spatial reasoning are important because the structure of the world is based on geometric properties.
- generate dilations using properties of similarity.

- plot points on a coordinate grid using ordered pairs of rational numbers and become familiar with perspective views.
- be familiar with transformations, including dilations, reflections, and translations.
- be familiar with the Pythagorean Theorem.
- have spatial-reasoning skills that help develop an understanding of distance, location, area, and volume.

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Objective 4

Student should demonstrate an understanding of the concepts and uses of measurement.

Students should:

- understand that the concepts and uses of measurement has many real-world applications and provides a basis for developing skills in geometry.
- develop measurement skills by using estimation, models, and nets to solve application problems involving surface area and volume.
- use the Pythagorean Theorem and other formulas to solve problems, such as determining flight patterns, constructing buildings, and surveying land.
- know proportional reasoning to describe how changes in dimensions affect distance, area, and volume.
- understand and apply estimation, theorems, formulas, and proportional reasoning.
- determine the reasonableness of answers and solve more difficult problems in high school, such as those that involve linear functions, equations, and inequalities.
- apply measurement skills in a multitude of situations inside and outside the classroom.

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Objective 5

Student should demonstrate an understanding of probability and statistics.

Students should:

- understand probability and statistics that will help students become informed consumers of data and information.
- describe and predict the results of probability experiment
- recognize and account for all the possibilities of a given situation.
- compare different graphical representations of the same data and solve problems by analyzing the data presented.
- recognize appropriate and accurate representations of data in everyday situations and in information related to science and social studies such as scatterplots, circle graphs, bar graphs, histograms, etc.
- calculate measures of central tendency which allows students to do many things, such as average grades, figure sports statistics, and determine election results.

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Objective 6

Student should demonstrate an understanding of the mathematical processes and tools used in problem solving.

Students should:

- understand underlying processes and mathematical tools that are critical for students to be able to apply mathematics in their everyday lives.
- know that problems found in everyday life often require the use of multiple concepts and skills.
- recognize mathematics as it occurs in real life problem situations, generalize from mathematical patterns and sets of examples, select an appropriate approach to solving a problem, solve the problem, and then determine whether the answer is reasonable.
- express problem situations in mathematical language and symbols as essential for finding solutions to real life questions.
- communicate clearly and use logical reasoning to make sense of their world.
- connect the concepts learned in mathematics to other disciplines and higher mathematics.
- analyze and solve real world problems.

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About the Exam

The EA/CBE consists of 100 objective questions that are equally weighted. The exam may consist of multiple-choice and true-false questions. The exams will include an exam booklet and a separate computer graded answer sheet. Enough room is left around each item in the booklet for students to work each problem. Student responses **must** be recorded on the computer graded answer sheet. Students will be allowed **3 hours** to take the exam and you will be allowed to use a **graphing calculator**.

Formula Sheets with the Exam

A formula sheet and rulers are provided to use throughout the exam. You will be provided this formula sheet with your exam.

Perimeter	square	$P = 4s$
	rectangle	$P = 2l + 2w$ or $P = 2(l + w)$
Circumference	circle	$C = 2\pi r$ or $C = \pi d$
Area	square	$A = s^2$
	rectangle	$A = lw$ or $A = bh$
	triangle	$A = \frac{1}{2}bh$ or $A = \frac{bh}{2}$
	trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$ or $A = \frac{(b_1 + b_2)h}{2}$
	circle	$A = \pi r^2$
Surface Area	cube	$S = 6s^2$
	cylinder	Lateral: $S = 2\pi rh$
		Total: $S = 2\pi rh + 2\pi r^2$ or $S = 2\pi r(h + r)$
	cone	Lateral: $S = \pi rl$
Total: $S = \pi rl + \pi r^2$ or $S = \pi r(l + r)$		
sphere	$S = 4\pi r^2$	
Volume	prism	$V = Bh^*$
	cylinder	$V = Bh^*$
	pyramid	$V = \frac{1}{3}Bh^*$
	cone	$V = \frac{1}{3}Bh^*$
	sphere	$V = \frac{4}{3}\pi r^3$
	*B represents the area of the Base of a solid figure	
Pi	π	$\pi = 3.14$ or $\pi = \frac{22}{7}$
Pythagorean Theorem	$a^2 + b^2 = c^2$	
Simple Interest Formula	$I = prt$	

MASS AND WEIGHT

1 kilogram = 1000 grams	1 ton = 2000 pounds
1 gram = 1000 milligrams	1 pound = 16 ounces

LENGTH

Metric	Customary
1 kilometer = 1000 meters	1 mile = 1760 yards
1 meter = 100 centimeters	1 mile = 5280 feet
1 centimeter = 10 millimeters	1 yard = 3 feet
	1 foot = 12 inches

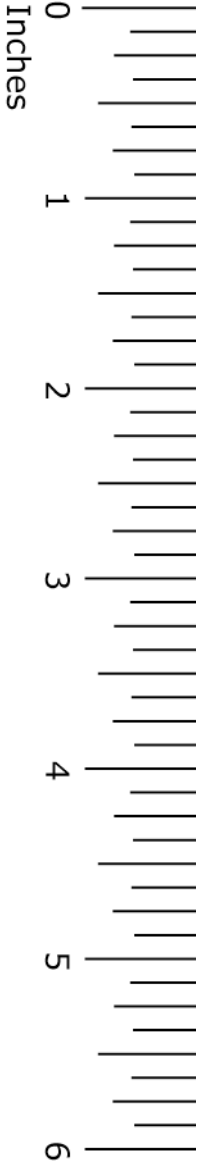
CAPACITY AND VOLUME

Metric	Customary
1 liter = 1000 milliliters	1 gallon = 4 quarts
	1 gallon = 128 ounces
	1 quart = 2 pints
	1 pint = 2 cups
	1 cup = 8 ounces

TIME

1 year = 365 days
1 year = 12 months
1 year = 52 weeks
1 week = 7 days
1 day = 24 hours
1 hour = 60 minutes
1 minute = 60 seconds

You will be provided these rulers with your exam.



Sample Questions

These sample questions will give you a better idea of the types of questions you can expect on the EA/CBE. These are provided to illustrate the format of the exam. They are not the actual exam. In order to be successful on the exam, you must study the TEKS for this grade level and subject area.

1. Rewrite 0.00000445 in scientific notation.

- A 4.45×10^{-5}
- B 0.445×10^{-5}
- C 4.45×10^{-6}
- D 44.5×10^{-7}

2. Find the product.

$$-7\left(\frac{3}{9}\right)$$

- A $-\frac{7}{9}$
- B $-\frac{1}{21}$
- C $\frac{1}{3}$
- D $-2\frac{1}{3}$

3. A baker can make 96 cookies in 12 minutes. At this rate, how many cookies can she make per minute?

- A 6
- B 8
- C 9
- D 7

Answer Key

Item Number	Correct Answer
1	C
2	D
3	B