



Geometry B Study Guide Credit by Exam for Credit Recovery or Acceleration

The exam you are interested in taking is designed to test your proficiency in the relevant subject matter. You should be thoroughly familiar with the subject matter before you attempt to take the exam. This CBE CR/A Study Guide can help you prepare for the exam by giving you an idea of what you need to review. You can check your familiarity level by reviewing the Texas Essential Knowledge and Skills (TEKS) for this course. (See below.) To refine your skills, you can refer to any of the state-adopted textbooks.

Texas Essential Knowledge and Skills (TEKS)

Every question that appears on this exam is derived from the knowledge and skills statements and student expectations within the Texas-mandated standards, the Texas Essential Knowledge and Skills (TEKS). You can view the TEKS for this exam online via the following link: <http://ritter.tea.state.tx.us/rules/tac/chapter111/ch111c.html#111.41> Refer to section (c), Knowledge and skills, 1A–13E. Throughout this guide, you'll see TEKS references. These refer to the numbers listed under (c) Knowledge and skills; for example, 1A or 3B.

Materials Needed

You will need to bring a graphing calculator. The formula sheet at the end of this study guide will be provided during the exam. You can also bring this formula sheet with you to your exam. If you are taking a print exam, you must bring a #2 pencil to complete the exam. You will receive a computer-graded answer sheet when you arrive at the testing center. The proctor will provide scratch paper.

Exam Structure

You will be allowed **3 hours** to complete this exam. The Geometry B exam consists of 40 multiple-choice questions worth a total of 100 points. The exam covers a wide variety of topics. To help you study, we have isolated 6 key topics and provided study tips and sample questions for each. You can expect several multiple-choice questions on each of the following topics:

Topic 1: Plan and Solve Real-world Problems

Topic 2: Transformations and Symmetries

Topic 3: Cross Sections and Dimensional Analysis of Three Dimensional Figures

Topic 4: Area and Volume Problems

Topic 5: Circles

Topic 6: Probability

Formula Chart

You will be provided with the following formula chart. Familiarize yourself with these formulas and how to use them to solve problems based on the TEKS above.

Scholastic Honesty

When you arrive at the testing center you will be asked to carefully read the exam rules and sign a statement agreeing to take the exam in accordance with the rules. This is called the Examinee's Certification. The following is a copy of these rules:

Examinee's Certification

This certification must be signed *before* the exam is administered and then returned with the completed examination attached, or credit for the exam will not be given.

Scholastic dishonesty is a serious academic violation that will not be tolerated. Scholastic dishonesty encompasses, but is not limited to:

- copying from another student's work;
- using an unauthorized testing proctor or taking the exam at an unauthorized testing location;
- using materials not authorized by a testing proctor;
- possessing materials that are not authorized by a testing proctor, such as lessons, books, or notes;
- knowingly using or soliciting, in whole or Topic, the contents of an unadministered test;
- collaborating with or seeking aid from another student without authorization during the test;
- substituting for another person, or permitting another person to substitute for oneself, in taking a course test or completing any course-related assignment;
- using, buying, stealing, or transporting some or all of the contents of an unadministered test, test rubric, homework answer, or computer program.

Evidence of scholastic dishonesty will result in a grade of *F* on the examination and an *F* in the course (if applicable).

At the testing center, you will be asked to sign a statement that says you have read the above and agree to complete the examination with scholastic honesty.

General Study Tips

The bulleted lists and sample questions in this study guide can assist you in preparing for the exam. It is a fairly complete guide for studying, but does not cover every item on the test. Ultimately, you should use the TEKS to guide your exam preparation.

Additional Study Tips

The following information provides direction for your studies. For each part, you will find study tips and sample questions to give you a general idea of the types of questions you can expect to see on the exam.

Topic 1: Plan and Solve Real-world Problems

This is a broad topic that can relate to any type of question. Students should show the ability to create a plan for problem-solving, explain their reasoning, and solve problems arising in everyday life.

Study Tips for Topic 1:

This topic relates to TEKS 1A–1G. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

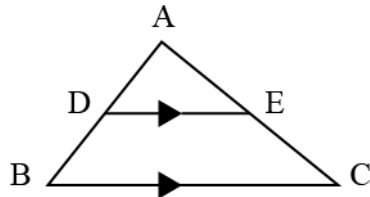
- Solve word problems about the workplace and every day interactions in society
- Justify your solution to a problem
- Explain if a solution is or is not reasonable
- Create and use tables, graphs, number lines, Venn Diagrams and other representations to organize information

Sample Questions for Topic 1:

The following are sample questions. You can find the correct answers listed after the questions, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the **BEST** responses to the following questions.

1. Derek plans to hang a shelf in his attic. The walls are sloped and meet at the peak point A , as shown in the figure below where wall AB is 7 feet long and wall AC is 9 feet long. A hole for shelf DE is drilled on wall AB 4 feet up the wall so that $BD = 4$. Since Derek wants the shelf to be parallel to floor BC , where should he drill hole E ?



- A. 3.11 feet up the wall from C .
- B. 3.86 feet up the wall from C .
- C. 5.14 feet up the wall from C .
- D. 5.75 feet up the wall from C .

Topic 2: Transformations and Symmetries

This topic relates to your understanding of using coordinate geometry to describe transformations, to find the coordinates before or after any transformation takes place, as well as identify various types of symmetries of two dimensional objects.

Study Tips for Topic 2:

This topic relates to TEKS 3A–3D. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

- Perform transformations of a figure in a plane and give the coordinates for the points (e.g. the vertices of a given quadrilateral after a translation)
- Label coordinates of an image or a preimage of a figure in the plane where more than one composition is applied (e.g. find the vertices of a rectangle after a dilation centered at the origin and a reflection across the x -axis)
- Identify the sequence of transformations that will move a pre-image onto an image
- Identify and distinguish between reflectional and rotational symmetry in a plane figure

Sample Questions for Topic 2:

The following are sample questions. You can find the correct answers listed after the questions, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the **BEST** responses to the following questions.

2. Determine which type(s) of symmetry describes the plane object below.

S

- A. Rotational
B. Reflectional
C. Both rotational and reflectional
D. Neither rotational nor reflectional
3. Quadrilateral $ABCD$ is rotated 90° counterclockwise around the origin and dilated by a factor of 3 with the center of dilation located at the origin. If the coordinates of quadrilateral $ABCD$ are $A(-2, 2)$, $B(0, 2)$, $C(0, -1)$, and $D(-2, 0)$, what are the coordinates of the image after rotation and dilation?
- A. $A'(-3, 3)$, $B'(-6, 0)$, $C'(3, 0)$, $D'(-3, 0)$
B. $A'(-6, 6)$, $B'(-6, 0)$, $C'(1.5, 0)$, $D'(0, -6)$
C. $A'(-6, 6)$, $B'(-3, 0)$, $C'(1.5, 0)$, $D'(0, -3)$
D. $A'(-6, -6)$, $B'(-6, 0)$, $C'(3, 0)$, $D'(0, -6)$

Topic 3: Cross Sections and Dimensional Analysis of Three Dimensional Figures

This topic relates to your understanding of the two dimensional shapes created by looking at cross sections of various three-dimensional objects, as well as the effects on changes in the size of various two and three dimensional objects.

Study Tips for Topic 3:

This topic relates to TEKS 10A and 10B. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

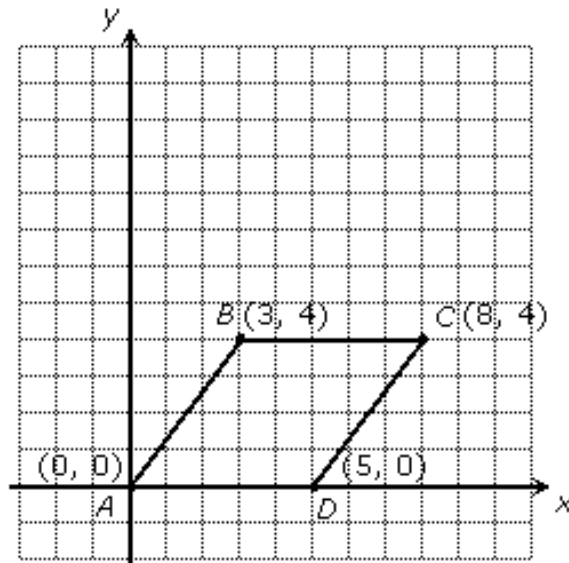
- Identify the shapes of two-dimensional cross sections of prisms, pyramids, cylinders, cones, and spheres
- Identify which three dimensional object is created by rotating a two dimensional shape
- Determine the effect on area when one dimension of an object is changed
- Determine the effect on volume when one dimension of an object is changed

Sample Questions for Topic 3:

The following are sample questions. You can find the correct answers listed after the questions, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the **BEST** responses to the following questions.

4. The diagram below shows a rhombus with side lengths of 5 units. If the rhombus is dilated by a scale factor of 3, describe the effect on the area of the rhombus.



- A. The new rhombus has an area 3 times as big.
- B. The new rhombus has an area 6 times as big.
- C. The new rhombus has an area 9 times as big.
- D. The new rhombus has an area 12 times as big.

5. If a rectangle is rotated about an axis going straight through the middle of the rectangle, which of these three dimensional solids would be formed?
- A. Cone
 - B. Sphere
 - C. Pyramid
 - D. Cylinder

Topic 4: Area and Volume Problems

This topic relates to your understanding of problem solving with two and three-dimensional objects, including surface area and volume problems. You will need to familiarize yourself with the area, surface area, and volume formulas given on the formula chart before taking your exam.

Study Tips for Topic 4:

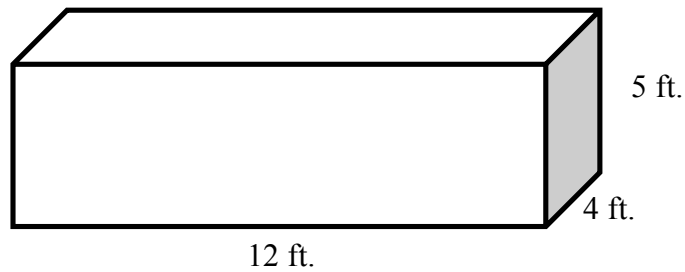
This topic relates to TEKS 11A–11D. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

- Use the formula for area of regular polygons to solve real world problems
- Recognize the shapes that make up a composite figure and determine the area. In particular, you will be asked about the area of composite figures made up of triangles, parallelograms, kites, trapezoids, and sectors of circles
- Apply the formulas for total surface area and lateral surface area of cones, pyramids, cylinders, and pyramids to solve problems
- Apply the formulas for the volume of three dimensional figures to solve problems
- In all problems you will be asked to use correct units of measure (i.e. you should know whether to use cm^2 or cm^3 and why)

Sample Questions for Topic 4:

The following are sample questions. You can find the correct answers listed after the questions, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Use the diagram for questions 6 and 7. Select the **BEST** responses to the following questions.



6. Jason needs to create 10 boxes with the dimensions shown in the figure above for a design contest. So that the boxes have the appropriate weight, he will need to fill all 10 boxes with sand. How much sand should he purchase for the project?
- D. 1,750 cubic feet
 - C. 1,800 cubic feet
 - B. 2,000 cubic feet
 - A. 2,400 cubic feet
7. Jason will need to paint the boxes as well. All of the boxes are being stacked, so he can save money by not painting the tops or bottoms of all 10 boxes. Which of these most closely represents how much area he will need to paint?
- D. 800 square feet
 - C. 1,200 square feet
 - B. 1,600 square feet
 - A. 5,200 square feet

Topic 5: Circles

This topic relates to your understanding of special theorems, angles, and segments related to circles. Before taking the exam, be sure you know about chords, central angles, arc length, tangents, secants, and sectors to name a few. Also, be prepared to use the formulas for circles on the formula sheet in conjunction with proportions.

Study Tips for Topic 5:

This topic relates to TEKS 12A–12E. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

- Understand the relationship between central angles, inscribed angles, and the intercepted arcs
- Use proportions to solve problems involving intercepted arcs and proportions
- Use proportions to solve problems involving the area of a circle and the area of a sector of that circle
- Describe the radian measure of an angle as the ratio of the length of an arc intercepted by a central angle and the radius of the circle
- Understand how the equation of a circle centered at the origin relates to the Pythagorean Theorem
- Extend the concept of the equation of a circle centered at the origin to the equation of a circle centered at (h, k) and use it to solve problems

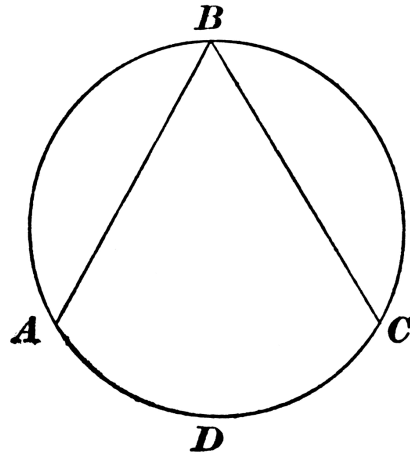
Sample Questions for Topic 5:

The following are sample questions. You can find the correct answers listed after the questions, but try answering the questions without looking at the answers first to check your comprehension.

DIRECTIONS: Select the **BEST** responses to the following questions.

8. Given the center of a circle is at $(2, -4)$ and one of the points on the circle is $(5, -8)$, what is the length of the diameter of the circle?
- D. 5
C. 6
B. 10
A. 12

9. If the measure of arc ADC is 47° , what is the measure of angle ABC ?



- A. $m\angle ABC = 94^\circ$
B. $m\angle ABC = 47^\circ$
C. $m\angle ABC = 23.5^\circ$
D. $m\angle ABC = 90^\circ$

Topic 6: Probability

This topic relates to your understanding of use of probability models to represent simple and compound events, as well as how to use them to solve problems and make decisions.

Study Tips for Topic 5:

This topic relates to TEKS 13A to 13E. Familiarize yourself with those TEKS, and then be prepared to demonstrate knowledge of the following topics:

- Use permutations and combinations to solve real world problems
- Distinguish between situations that involve permutations and situations that involve combinations
- Use an area model to solve probability problems
- Determine whether two events are independent or dependent events
- Compute the probability of two events occurring together, with or without replacement
- Apply conditional probability to solve problems
- Apply the concept of independence to solve problems

Sample Questions for Topic 5:

The following are sample questions. You can find the correct answers listed after the questions, but try answering the questions without looking at the answers first to check your comprehension.

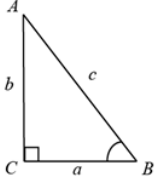
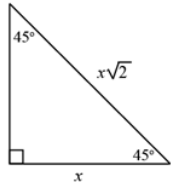
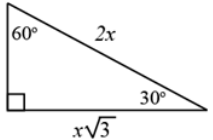
DIRECTIONS: Select the **BEST** responses to the following questions.

10. Mr. Selan gave his class two tests. 32% of the class passed both tests, and 70% of the class passed the first test. What percent of those who passed the first test also passed the second test?
- A. About 22%
 - B. About 32%
 - C. About 38%
 - D. About 46%

Answer Key

| Item Number | Correct Answer | TEKS expectation |
|-------------|----------------|------------------|
| 1 | C | 1A, 1B |
| 2 | A | 3D |
| 3 | D | 3B |
| 4 | C | 10B |
| 5 | D | 10A |
| 6 | D | 11D |
| 7 | C | 11C |
| 8 | C | 12A |
| 9 | C | 12A |
| 10 | D | 13D |

Geometry Formula Sheet

| Coordinate Geometry | |
|--|--|
| Distance Formula: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ | Slope of a line: $m = \frac{y_2 - y_1}{x_2 - x_1}$ |
| Midpoint Formula: $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ | Slope-Intercept Form of an Equation: $y = mx + b$ |
| Standard Form of a Linear Equation: $Ax + By = C$ | Point-Slope Form of an Equation: $y - y_1 = m(x - x_1)$ |
| Perimeter and Circumference | |
| Perimeter of a rectangle: $P = 2l + 2w$ or $P = 2(l + w)$ | Circumference: $C = 2\pi r$ or $C = \pi d$ |
| Area | Surface Area |
| Rectangle or Parallelogram: $A = bh$ | Prism: <i>Lateral SA</i> = Ph <i>Total SA</i> = $Ph + 2B$ |
| Regular Polygon: $A = \frac{1}{2}aP$ | Cylinder: <i>Lateral SA</i> = $2\pi rh$ <i>Total SA</i> = $2\pi rh + 2\pi r^2$ |
| Triangle: $A = \frac{1}{2}bh$ | Pyramid: <i>Lateral SA</i> = $\frac{1}{2}Pl$ |
| Trapezoid: $A = \frac{1}{2}(b_1 + b_2)h$ | <i>Total SA</i> = $\frac{1}{2}Pl + B$ |
| Circle: $A = \pi r^2$ | Cone: <i>Lateral SA</i> = πrl <i>Total SA</i> = $\pi rl + \pi r^2$ |
| Rhombus: $A = \frac{1}{2}d_1d_2$ | Sphere: <i>Total SA</i> = $4\pi r^2$ |
| Volume | Right Triangles |
| Prism or cylinder: $V = Bh$ | <div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 20px;"> $\sin(\angle B) = \frac{\text{opposite side}}{\text{hypotenuse}}$ $\cos(\angle B) = \frac{\text{adjacent side}}{\text{hypotenuse}}$ $\tan(\angle B) = \frac{\text{opposite side}}{\text{adjacent side}}$ </div>  </div> |
| Pyramid or cone: $V = \frac{1}{3}Bh$ | |
| Sphere: $V = \frac{4}{3}\pi r^3$ | |
| | <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <div style="text-align: center; margin-top: 10px;"> Pythagorean Theorem: $a^2 + b^2 = c^2$ </div> |