

 CollegeBoard

CLEP[®]

CLEP[®] College Algebra

AT A GLANCE

Description of the Examination

The College Algebra examination covers material that is usually taught in a one-semester college course in algebra. Nearly half of the test is made up of routine problems requiring basic algebraic skills; the remainder involves solving nonroutine problems in which candidates must demonstrate their understanding of concepts. The test includes questions on basic algebraic operations; linear and quadratic equations, inequalities, and graphs; algebraic, exponential and logarithmic functions; and miscellaneous other topics. It is assumed that candidates are familiar with currently taught algebraic vocabulary, symbols, and notation. The test places little emphasis on arithmetic calculations. However, an online scientific calculator (nongraphing) will be available during the examination.

The examination contains approximately 60 questions to be answered in 90 minutes. Some of these are pretest questions that will not be scored.

Knowledge and Skills Required

Questions on the College Algebra examination require candidates to demonstrate the following abilities in the approximate proportions indicated.

- Solving routine, straightforward problems (about 50% of the examination)
- Solving nonroutine problems requiring an understanding of concepts and the application of skills and concepts (about 50% of the examination)

The subject matter of the College Algebra examination is drawn from the following topics. The percentages next to the main topics indicate the approximate percentage of exam questions on that topic.

25% ALGEBRAIC OPERATIONS

- Operations with exponents
- Factoring and expanding polynomials
- Operations with algebraic expressions
- Absolute value
- Properties of logarithms

25% EQUATIONS AND INEQUALITIES

- Linear equations and inequalities
- Quadratic equations and inequalities
- Absolute value equations and inequalities
- Systems of equations and inequalities
- Exponential and logarithmic equations

30% FUNCTIONS AND THEIR PROPERTIES¹

- Definition, interpretation, and representation/modeling (graphical, numerical, symbolic, verbal)
- Domain and range
- Evaluation of functions
- Algebra of functions
- Graphs and their properties (including intercepts, symmetry, transformations)
- Inverse functions

20% NUMBER SYSTEMS AND OPERATIONS

- Real numbers
- Complex numbers
- Sequences and series
- Factorials and Binomial Theorem

1. Each test may contain a variety of functions, including linear, polynomial (degree ≤ 5), rational, absolute value, power, exponential, logarithmic, and piecewise-defined.

Study Resources

Most textbooks used in college-level algebra courses cover the topics in the outline above, but the approaches to certain topics and the emphases given to them may differ. To prepare for the College Algebra exam, it is advisable to study one or more college textbooks, which can be found in most college bookstores.

A recent survey conducted by CLEP® found that the following textbooks are among those used by college faculty who teach the equivalent course. Most of these have companion websites with practice test questions and other study resources. HINT: When selecting a textbook, check the table of contents against the Knowledge and Skills Required for this test.

Aufmann et al., <i>Algebra: Introductory and Intermediate</i> (Cengage)
Huettenmueller, <i>College Algebra Demystified</i> (McGraw-Hill)
Barnett et al., <i>College Algebra</i> (McGraw-Hill)
Barnett et al., <i>College Algebra: Graphs and Models</i> (McGraw-Hill)
Beecher, Penna and Bittinger, <i>College Algebra</i> (Addison-Wesley)
Blitzer, <i>College Algebra Essentials</i> (Prentice Hall)
Dugopolski, <i>College Algebra and Trigonometry</i> (Addison-Wesley)
Gustafson and Frisk, <i>College Algebra: Essentials</i> (Brooks/Cole)
Stewart et al., <i>College Algebra</i> (Brooks/Cole)
Larson and Hostetler, <i>College Algebra</i> (Brooks/Cole)
Lial et al., <i>College Algebra</i> (Addison-Wesley)
Ratti and McWaters, <i>College Algebra</i> (Addison-Wesley)
Sullivan, <i>College Algebra Essentials</i> (Prentice Hall)
Young, <i>College Algebra</i> (Wiley)
Rockswold, <i>College Algebra Through Modeling and Visualization</i> (Addison-Wesley)

In addition, the following resources, compiled by the CLEP test development committee and staff members, may help you study for your exam. However, none of these sources are designed specifically to provide preparation for a CLEP exam. The College Board has no control over their content and cannot vouch for accuracy.

http://www.wtamu.edu/academic/anns/mps/math/mathlab/col_algebra/index.htm

(West Texas A&M Virtual Math lab—College Algebra)

<http://www.libraryofmath.com/college-algebra.html>

(Library of Math)

https://modernstates.org/course/college_algebra/

(Modern States Education Alliance)

Visit www.collegeboard.com/clepprep for additional algebra resources. You can also find suggestions for exam preparation in Chapter IV of the *CLEP Official Study Guide*. In addition, many college faculty post their course materials on their schools' websites.

Sample Test Questions

The following sample questions do not appear on an actual CLEP examination. They are intended to give potential test takers an indication of the format and difficulty level of the examination and to provide content for practice and review. Knowing the correct answers to all of the sample questions is not a guarantee of satisfactory performance on the exam. For more sample questions and information about the test, see the *CLEP Official Study Guide*.

Directions: An online scientific calculator will be available for the questions on this test.

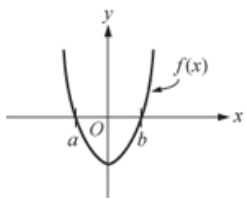
Some questions will require you to select from among the five choices. For these questions, select the BEST of the choices given.

Some questions will require you to type a numerical answer in the box provided.

Some questions will require you to select one or more answer choices.

NOTES:

- Unless otherwise specified, the domain of any function f is assumed to be the set of all real numbers x for which $f(x)$ is a real number.
 - i will be used to denote $\sqrt{-1}$.
 - Figures that accompany questions are intended to provide information useful in answering the questions. All figures lie in a plane unless otherwise indicated. The figures are drawn as accurately as possible EXCEPT when it is stated in a specific question that the figure is not drawn to scale. Straight lines and smooth curves may appear slightly jagged on the screen.
- What is the remainder when the polynomial $x^{53} - 12x^{40} - 3x^{27} - 5x^{21} + x^{10} - 3$ is divided by $x + 1$?
 - 21
 - 7
 - 3
 - 4
 - 21
 - Let a , b , and c be real numbers, where $a \neq 0$. If the equation $ax^2 + bx + c = 0$ has two real solutions, which of the following statements could be true? Indicate all such statements.
 - $a > 0$, $b > 0$, and $c < 0$
 - $b = \pm\sqrt{ac}$
 - $ac < 0$
 - A science class launched a rocket from level ground. The height h , in feet, of the rocket above the ground t seconds after it was launched can be modeled by the function $h(t) = -16t^2 + 64t$. How many seconds did it take for the rocket to return to the ground?
 - At a certain shipping company, the cost to deliver a package depends on its weight. The company charges a flat rate of \$7.00 for the first 5 kilograms plus \$1.50 for each additional kilogram or fraction thereof. For this company, which of the following functions represents the cost C , in dollars, to deliver a package with a weight of k kilograms, where k is an integer greater than or equal to 5?
 - $C(k) = 7 + 1.5k$
 - $C(k) = 7(5) + 1.5k$
 - $C(k) = 7 + 1.5(k - 5)$
 - $C(k) = 7(5) + 1.5(k - 5)$
 - $C(k) = 7 + 5(k - 1.5)$



5. The graph of the quadratic function f is shown in the xy -plane. The linear function g is defined by $g(x) = cx$ for all real numbers x , where c is a positive constant. Which of the following must be true?

- A. $f(0) > g(0)$
- B. $f(a) > g(0)$
- C. $f(a) > g(a)$
- D. $f(a) > g(b)$
- E. $f(b) > g(b)$

x	$f(x)$	$g(x)$
0	9	1
1	2	5
2	1	3
3	3	8

6. The table shows some values of the functions f and g . Based on the table, what is the value of $g(f(2))$?
- A. 0
 - B. 3
 - C. 5
 - D. 8
 - E. 9
7. At the beginning of each year, the population of a small town is predicted to be 2 percent greater than its population at the beginning of the preceding year. If P is the population of the town on January 1, 2018, what is the predicted population of the town on January 1, 2023?
- A. $(5 \cdot 0.02)P$
 - B. $(1 + 5 \cdot 0.02)P$
 - C. $(1.02 + 5)P$
 - D. $(0.02)^5P$
 - E. $(1.02)^5P$

8. Let $\log_a x = 2$, $\log_a y = 3$, and $\log_a z = 4$, where a is a positive number that is not equal to 1. What is the value of $\log_a \left(\frac{x^3 y}{\sqrt{z}} \right)$?

9. Which of the following is equal to $\frac{(i+3)(i+2)}{i^2}$?

- A. $5i + 7$
- B. $5i + 5$
- C. $5i - 5$
- D. $-5i + 7$
- E. $-5i - 5$

10. What is the highest-degree term in the expansion of $\frac{(x+2)^5 - x^5}{2}$?

- A. $\frac{x^4}{2}$
- B. $5x^4$
- C. $10x^4$
- D. $\frac{x^5}{2}$
- E. x^5

Credit Recommendations

The American Council on Education has recommended that colleges grant 3 credits for a score of 50, which is equivalent to a course grade of C, on the CLEP College Algebra exam. Each college, however, is responsible for setting its own policy. For candidates with satisfactory scores on the CLEP College Algebra examination, colleges may grant credit toward fulfillment of a distribution requirement, or for a particular course that matches the exam in content. Check with your school to find out the score it requires for granting credit, the number of credit hours granted, and the course that can be bypassed with a passing score.

Answers to Sample Questions:

1-B; 2-A,C; 3-4; 4-C; 5-C; 6-C; 7-E; 8-7; 9-E; 10-B.