CLEP® Precalculus: At a Glance

Description of the Examination

The CLEP® Precalculus examination assesses student mastery of skills and concepts required for success in a first-semester calculus course. A large portion of the exam is devoted to testing a student's understanding of functions and their properties. Many of the questions test a student's knowledge of specific properties of the following types of functions: linear, quadratic, absolute value, square root, polynomial, rational, exponential, logarithmic, trigonometric, inverse trigonometric and piecewise defined. Questions on the exam will present these types of functions symbolically, graphically, verbally or in tabular form. A solid understanding of these types of functions is at the core of all precalculus courses, and it is a prerequisite for enrolling in calculus and other college-level mathematics courses.

A graphing calculator, which is integrated into the exam software, is available to students only during Section 1 of the exam. Students are expected to know how and when to make use of it. The graphing calculator, together with a brief tutorial, is available to students as a free download for a 30-day trial period. Students are expected to become familiar with its functionality prior to taking the exam. For more information about downloading the practice version of the graphing calculator, please visit the Precalculus exam description on the CLEP website, **www.collegeboard.com/clep**.

The examination contains approximately 48 questions, in two sections, to be answered in 90 minutes.

- Section 1: 25 questions, 50 minutes. The use of an **online graphing calculator (non-CAS)** is allowed for this section. Only some of the questions will require the use of the calculator.
- Section 2: 23 questions, 40 minutes. No calculator is allowed for this section. Although most of the questions on the exam are multiple choice, there are some questions that require students to enter a numerical answer.

Knowledge and Skills Required

Questions on the examination require candidates to demonstrate the following abilities:

- Recalling factual knowledge and/or performing routine mathematical manipulation
- Solving problems that demonstrate comprehension of mathematical ideas and/or concepts
- Solving nonroutine problems or problems that require insight, ingenuity or higher mental processes

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

20% Algebraic Expressions, Equations and Inequalities

Ability to perform operations on algebraic expressions

Ability to solve equations and inequalities, including linear, quadratic, absolute value, polynomial, rational, radical, exponential, logarithmic and trigonometric

Ability to solve systems of equations, including linear and nonlinear

15% Functions: Concept, Properties and Operations

Ability to demonstrate an understanding of the concept of a function, the general properties of functions (e.g., domain, range), function notation, and the ability to perform symbolic operations with functions (e.g., evaluation, inverse functions)

30% Representations of Functions: Symbolic, Graphical and Tabular

Ability to recognize and perform operations and transformations on functions presented symbolically, graphically or in tabular form

Ability to demonstrate an understanding of basic properties of functions and to recognize elementary functions (linear, quadratic, absolute value, square root, polynomial, rational, exponential, logarithmic, trigonometric, inverse trigonometric and piecewise-defined functions) that are presented symbolically, graphically or in tabular form

10% Analytic Geometry

Ability to demonstrate an understanding of the analytic geometry of lines, circles, parabolas, ellipses and hyperbolas

15% Trigonometry and Its Applications*

Ability to demonstrate an understanding of the basic trigonometric functions and their inverses and to apply the basic trigonometric ratios and identities (in right triangles and on the unit circle)

Ability to apply trigonometry in various problem-solving contexts

10% Functions as Models

Ability to interpret and construct functions as models and to translate ideas among symbolic, graphical, tabular and verbal representations of functions

* Note that trigonometry permeates most of the major topics and accounts for more than 15 percent of the exam. The actual proportion of exam questions that requires knowledge of either right triangle trigonometry or the properties of the trigonometric functions is approximately 30–40 percent.

Study Resources

Most textbooks used in college-level precalculus 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 CLEP Precalculus exam, it is advisable to study one or more college textbooks, which can be found for sale online or in most college bookstores.

A recent survey conducted by CLEP found that the following textbooks (for group authors, first author listed only) 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.

Axler, *Precalculus: A Prelude to Calculus* (Wiley)
Barnett, *Precalculus: Functions and Graphs* (McGraw-Hill)
Bittinger, *Precalculus: Graphs and Models* (Addison-Wesley)
Blitzer, *Precalculus* (Prentice-Hall)
Connally, *Functions Modeling Change* (Wiley)
Dugopolski, *Precalculus: Functions and Graphs* (Addison-Wesley)
Faires and DeFranza, *Precalculus* (Brooks/Cole)
Hungerford and Shaw, *Contemporary Precalculus* (Brooks/Cole)
Larson and Hostetler, *Precalculus: A Concise Course* (Brooks/Cole)
Narasimhan, *Precalculus: Building Concepts and Connections* (Brooks/Cole)
Ratti and McWaters, *Precalculus* (Addison-Wesley)
Safier, *Schaum's Outline of Precalculus* (McGraw-Hill)
Slavin and Crisonino, *Precalculus: A Self-Teaching Guide* (Wiley)
Stewart, *Precalculus: Mathematics for Calculus* (Brooks/Cole)
Sullivan, *Precalculus* (Pearson/Prentice-Hall)
Swokowski and Cole, *Precalculus: Functions and Graphs* (Brooks/Cole)
Zill and Dewar, *Precalculus with Calculus Previews* (Jones & Bartlett)

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://mathforum.org/mathtools/sitemap2/pc/ (Math Forum's Math Tools, Drexel University)

http://cow.math.temple.edu/~cow/cgi-bin/manager (Temple U. Calculus on the Web—online precalculus textbook)

http://archives.math.utk.edu/visual.calculus/0/index.html (Dr. Husch's U. of Tennessee Virtual Calculus and Precalculus Site)

**http://www.math.hmc.edu/calculus/tutorials** (brief precalculus review at Harvey Mudd College)

Visit **www.collegeboard.com/clepprep** for additional precalculus 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. For more sample questions and information about the test, see the *CLEP Official Study Guide*.

Questions 1–4 are examples of questions that you might find in Section 1 of the exam; the use of a graphing calculator would be appropriate.
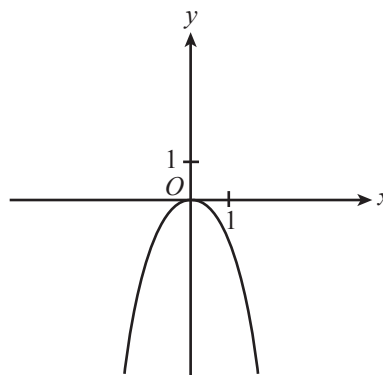
1. The function f defined by $f(x) = -x^2$ is graphed in the xy-plane above. The graph of the function g is obtained by reflecting the graph of f across the line $y = 1$. What is the value of $g(4)$?

(A)   14

(B)   15

(C)   16

(D)   17

(E)   18
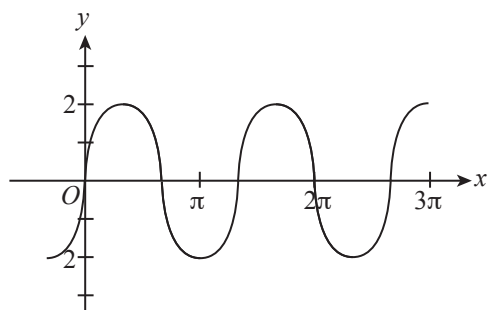
2. Which of the following could be an equation of the function graphed in the xy-plane above?

(A) $y = 2 \sin\left(\dfrac{3}{2}x\right)$

(B) $y = 3 \sin\left(\dfrac{2}{3}x\right)$

(C) $y = 3 \sin(2x)$

(D) $y = 2 \cos\left(\dfrac{3}{2}x\right)$

(E) $y = 3 \cos\left(\dfrac{2}{3}x\right)$

3. Let the function h be defined by $h(x) = 2 \cos(10x) + 12$. The maximum value of h is attained at which of the following values of x?

(A) $\dfrac{\pi}{5}$

(B) $\dfrac{\pi}{10}$

(C) $\dfrac{\pi}{15}$

(D) $\dfrac{\pi}{20}$

(E) $\dfrac{\pi}{40}$

$$A(t) = 1,000e^{0.05t}$$

4. Ellen put \$1,000 into a new savings account that paid 5% interest per year, compounded continuously. She made no deposits to or withdrawals from the account, and the amount, $A(t)$, in dollars, in the account t years from the time she opened the account is given by the function above. At this rate, how many years from the time she opened the account did the value of the account increase by 50 percent? (Round your answer to the nearest tenth of a year. Type your answer into the box below.)

5. The graph in the xy-plane of which of the following equations is a circle?

(A) $3xy = 6$

(B) $x^2 - 4 = y$

(C) $(x + 4)^2 = 36 + y^2$

(D) $(x - 3)^2 = 25 - (y + 2)^2$

(E) $(x - 6)^2 = (y - 6)^2$

www.theallpapers.com

6. If $4 = (t - 2\sqrt{3})(t + 2\sqrt{3})$, which of the following could be the value of t?

(A) -2

(B) -4

(C) $-4\sqrt{3}$

(D) $-2 + \sqrt{3}$

(E) $2 - \sqrt{3}$

$$f(x) = x(x + 1)$$
$$g(x) = x^2 - 1$$

7. The functions f and g are defined above. If $f(a) = g(a)$, what is the value of a?

(A) -2

(B) -1

(C) 0

(D) 1

(E) 2

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 Precalculus exam. Each college, however, is responsible for setting its own policy. For candidates with satisfactory scores on the CLEP Precalculus 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) E; (2) A; (3) A; (4) 8.1; (5) D; (6) B; (7) B.