

ARCO
Scholarship Exam Series

CLEP

College Level Examinations in **MATHEMATICS**

College Algebra, College Algebra-Trigonometry, and Trigonometry

Complete preparation for the **CLEP** in Mathematics

Comprehensive mathematics review including illustrated problems and solutions in the areas of Algebra, Plane and Solid Geometry and Measurements, Plane Trigonometry and Measurements, Plane Analytic Geometry, and Solid Analytic Geometry.

Sample examinations in Algebra, Trigonometry, and Algebra-Trigonometry, each complete with explanatory answers.

James W. Morrison

CLEP
College Level
Examinations in
MATHEMATICS

) *Scholarship Exam Series*

CLEP
College Level
Examinations in
MATHEMATICS

arco editorial board

ARCO PUBLISHING COMPANY, INC.
NEW YORK

Published by Arco Publishing Company, Inc.
219 Park Avenue South, New York, N.Y. 10003

Copyright © 1978 by Arco Publishing Company, Inc.

All rights reserved. No part of this book may be reproduced, by any means, without permission in writing from the publisher, except by a reviewer who wishes to quote brief excerpts in connection with a review in a magazine or newspaper.

Library of Congress Cataloging in Publication Data

Morrison, James Warner, 1940-
College level examinations in mathematics.

At head of title: CLEP

Bibliography: p.335

1. Algebra—Examinations, questions, etc.
 2. Trigonometry—Examinations, questions, etc.
- I. College-Level Examination Program. II. Title.
III. Title: CLEP.

QA157.M59 512.9 77-21106
ISBN 0-668-04339-3 (Paper Edition)

Printed in the United States of America

FOUR REASONS FOR USING THIS BOOK

This book is designed to provide you with valuable practice material for the CLEP Subject Examination in Mathematics. Our claim - that you will get a higher rating if you use this book diligently and methodically - has both educational and psychological validity for these four reasons:

1. YOU WILL KNOW WHAT TO STUDY. A candidate will do better on a test if he knows what to study. The Sample Tests in this book offer you specific examples of the kind of material you should study.
2. YOU WILL SPOTLIGHT YOUR WEAKNESSES. In using this book, you will discover where your weaknesses lie. This self-diagnosis will provide you with a systematic procedure of study whereby you will spend the greater part of your time where it will do the most good.
3. YOU WILL GAIN CONFIDENCE. There are in this book hundreds of questions similar to those which you will encounter on the actual test. As you work with these questions, you will get the "feel" of the exam and, thus, build up confidence. You will retain this confidence when you enter the examination room.
4. YOU WILL ADD TO YOUR KNOWLEDGE. "The learned become more learned." In going over the practice questions in this book, you will not - if you use this book properly - be satisfied merely with the answer to a particular question. You will want to do additional research on the other choices of the same questions. In this way, since it is quite possible that a question on the actual exam may require your knowing the meaning of one of these other choices.

CONTENTS

Part I: Introduction

What CLEP Will Do for You	11
College Without Tears	11
Can You Prepare for CLEP?	12
Let's Talk About CLEP	14
The CLEP Examination: General and Subject	15
External Degree Programs	15
How to Register for the Examinations	16
Addresses of Interest	16
Where Examinations Are Given	17
What Your CLEP Score Means	18
Hints for Scoring High on CLEP	20
The Gist of Test Strategy	22
Subject Tests: College-Level Examination Program	23
CLEP Subject Exams in Mathematics: College Algebra, College Algebra-	
Trigonometry, and Trigonometry	26
College Algebra	26
Trigonometry	27
College Algebra-Trigonometry	28

Part II: Mathematics Review

CLEP Mathematics Review	33
-------------------------	----

Part III: Illustrated Problems and Solutions in Mathematics

Illustrated Problems and Solutions	95
Algebra I and II	95
Plane and Solid Geometry and Measurements	110
Plane Trigonometry and Measurements	124
College Algebra	142
Plane Analytic Geometry	159
Solid Analytic Geometry	181

Part IV: Practice Examinations

CLEP College Algebra Test: Section I	199
Explanatory Answers	208
CLEP College Algebra Test: Section II	221
Explanatory Answers	230
CLEP Trigonometry Test: Section I	243
Explanatory Answers	253
CLEP Trigonometry Test: Section II	265
Explanatory Answers	274
CLEP College Algebra-Trigonometry Test: Section I	287
Explanatory Answers	297

CLEP College Algebra-Trigonometry Test: Section II	313
Explanatory Answers	323
Appendix A: Bibliography	335
Appendix B: Graphs, Angles, Trigonometry, and Vectors	337
Appendix C: Trigonometric Graphs and Tables	374

Part I

Introduction

WHAT CLEP WILL DO FOR YOU

COLLEGE WITHOUT TEARS

This book is for people who have attained the college level of education in nontraditional ways. It is for those who have gained their education outside the classroom. It tells about examinations that help you show what you know. These examinations give you the opportunity to:

- 1) have your educational attainment validated, thereby establishing the fact that you possess college-level skills and knowledge,
- 2) attain college credit for the knowledge you have attained outside the classroom and help you progress toward a degree,
- 3) avoid classroom attendance in subjects you already know and obtain advanced placement in a college curriculum,
- 4) qualify for jobs in industry that require college training as a prerequisite for employment or advancement,
- 5) demonstrate for your own satisfaction the college-level ability that you have gained.

If you want to take the CLEP exams but are reluctant for fear they may be too difficult, don't sell yourself short. The exams are not easy, but this book defines their difficulty and shows how to get ready. So read on...this book is for you. You will find out all about the CLEP General Examinations. You will learn:

- 1) how to register for the examinations;
- 2) where and when they are given;
- 3) how to interpret your scores and use the results to your best advantage;
- 4) how to prepare for the exams with hundreds of questions and answers typical of those found on the actual tests.

CAN YOU PREPARE FOR CLEP?

We believe, most certainly, that you can with the aid of this "self-tutor!"

It's not a "pony." It's not a complete college education. It's not

a "crib sheet." It's no How to Succeed On Tests Without Really Trying. There's nothing in it that will give you a higher score than you really deserve. It's just a top quality course which you can readily review in less than twenty hours...a digest of material which you might have written yourself after many hundred hours of laborious digging.

To prepare for your test, you must motivate yourself...get into the right frame of mind for learning from your "self-tutor." You'll have to urge yourself to learn and that's the only way people ever learn. Your efforts to score high on the test will be greatly aided by the fact that you will have to do this job on your own...perhaps without a teacher. Psychologists have demonstrated that studies undertaken for a clear goal ...which you initiate yourself and actively pursue...are the most successful. You, yourself, want to pass this test. That's why you bought this book and embarked on this program. Nobody forced you to do it, and there may be nobody to lead you through the course. Your self-activity is going to be the key to your success in the forthcoming weeks.

Used correctly, your "self-tutor" will show you what to expect and will give you a speedy brush-up on the subjects peculiar to your exam. Some of these are subjects not taught in schools at all. Even if your study time is very limited, you will:

- become familiar with the type of examination it is;
- improve your general examination-taking skill;
- improve your skill in analyzing and answering questions involving reasoning, judgment, comparison, and evaluation;
- improve your speed and skill in reading and understanding what you read -- an important part of your ability to learn and an important part of most tests;
- prepare yourself in the particular fields which measure your learning.

This book will tell you exactly what to study by presenting in full every type of question you will get on the actual exam. You'll do better merely by familiarizing yourself with them.

This book will help you find your weaknesses and find them fast. Once you know where you're weak, you can get right to work (before the exam) and concentrate on those soft spots. This is the kind of selective study which yields maximum results for every hour spent.

This book will give you the feel of the exam. Almost all our sample and practice questions are taken from actual previous exams. Since previous exams are not always available for inspection by the public, these sample test questions are quite important for you. The day you take your exam you'll see how closely this book follows the format of the real exam.

This book will give you confidence now, while you are preparing for the exam. It will build your self-confidence as you proceed. It will beat those dreaded before-test jitters that have hurt so many other test-takers.

This book stresses the modern, multiple-choice type of question because that's the kind you'll undoubtedly get on your exam. In answering these questions you will add to your knowledge by learning the correct answers, naturally. However, you will not be satisfied with merely the correct choice for each question. You will want to find out why the other choices are incorrect. This will jog your memory...help you remember much you thought you had forgotten. You'll be preparing and enriching yourself for the exam to come.

Of course, the great advantage in all this lies in narrowing your study to just those fields in which you're most likely to be quizzed. Answer enough questions in those fields and the chances are very good that you'll meet a few of them again on the actual test. After all, the number of questions an examiner can draw upon in these fields is rather limited. Examiners frequently employ the same questions on different tests for this very reason.

Arco Publishing Company has been involved with trends and methods in testing ever since the firm was founded in 1937. We have specialized in books that prepare people for exams. Based on this experience it is our modest boast that you probably have in your hands the best book that could be prepared to help you score high. Now, if you'll take a little advice on using it properly, we can assure you that you will do well.

To write this book we carefully analyzed every detail surrounding the forthcoming examination...

- official and unofficial announcements concerning the examination;
- all the available previous examinations;
- many related examinations;
- technical literature that explains and forecasts the examination.

As a result of all this (which you, happily, have not had to do), we've been able to create the "climate" of your test, and to give you a fairly accurate picture of what's involved.

LET'S TALK ABOUT CLEP

Anyone may take the CLEP examinations to gain college credit without attending formal college classes. If you possess college-level knowledge gained through study or experience and wish to earn credit for what you know, these exams can be important to you. If you are attending college for the first time you may be able to gain a whole year's credit, thus saving time as well as tuition. If you are already attending college, you may be able to meet your general education requirements through CLEP examinations. If you are unable to attend college full-time, CLEP can provide you with a flexible way of progressing at your own speed toward a college degree. The information in this chapter is summarized from various official announcements. We urge you to study it carefully because it is written to help you achieve the best possible score on your examination.

Do you have know-how that was gained from other than accredited college training? Have you read widely, or had life experiences that qualify you for jobs you can't get because you don't have the college credits? Or are you disqualified for advanced placement in college because you don't have the course credits from an accredited institution? If so, you are among the large number of people for whom the College-Level Examination Program is geared.

The College-Level Examination Program (CLEP) offers you an opportunity to show a college admissions officer, or a prospective employer, or just yourself, what you know in a variety of subject areas. Some employers in business, industry, professional groups, and government use the results of this test when they want to assess a potential employee's educational level, regardless of the credits listed on his resume. Many college admissions officers use the results of the test to determine where to place college applicants in their traditional four-year programs.

CLEP (College-Level Examination Program) is given by the College Entrance Examination Board, a nonprofit membership organization which for many years has offered testing and guidance services to schools and colleges and to students who progress from high school to college in the usual way. However, for those who have gained their education through correspondence courses, television courses, home-study courses via records or tape cassettes, on-the-job training, and experience, no widely recognized evaluation test has been available until CLEP.

The CLEP examinations may be taken by anyone who so desires if he but fulfills the formalities described in this chapter and pays the fees. However, there is no charge to military personnel on active duty.

THE CLEP EXAMINATION: GENERAL AND SUBJECT

The College-Level Examination Program (CLEP) consists of examinations that you may take for college credit or to demonstrate college-level competency. The program comprises two types of examinations: the General Examinations and the Subject Examinations.

The Subject Examinations test knowledge of a specific topic and are similar to the final examination in a particular undergraduate course.

The General Examinations are broader in scope and cover material you might be expected to know after two years' study in a basic liberal arts curriculum. They do not measure specialized knowledge of a particular discipline, nor are they based on a particular curriculum or course of study. They measure broad-based ability that can be acquired in a number of ways, through personal reading, employment, television, radio, adult classes, or advanced high school work.

EXTERNAL DEGREE PROGRAMS

A new trend in American higher education is the expansion of external degree programs. The traditional way of obtaining a college degree is to attend formal classes on campus for a period of about four years. Colleges that offer external degree programs allow independent study, have individualized curriculums with time schedules to suit the learner's needs, use new instructional methods, and have examinations to satisfy some of the degree requirements. In some cases, degrees are awarded on the basis of examination only.

CLEP Tests are used extensively in external degree programs. This kind of program is being developed in a number of states and at a variety of institutions. If you wish to learn on your own and would like to investigate an example of such a program, you may write Regents External Degrees, 99 Washington Avenue, Albany, New York 12210 or Thomas A. Edison College, Box 1293, Trenton, New Jersey 08625.

The New York State Board of Regents offers the following External Degrees: Associate in Arts, Bachelor of Science in Business Administration, and Associate in Applied Science in Nursing. The State of New Jersey offers a similar program administered through the Thomas A. Edison College. No classroom attendance is required and persons outside the states are eligible for admission to the programs.

HOW TO REGISTER FOR THE EXAMINATIONS

The first thing you should do if you are considering the possibility of utilizing your life experiences to obtain college credit is to write for the CLEP Registration Guide and the CLEP General and Subject Examinations booklet.

A combined Registration and Admission Form is available from Educational Testing Service. This completed form must be sent with your test fee to the test center you select no later than three weeks before the test is scheduled. Be sure to send your completed form and fee to the test center, not to the College Board. The Registration Form calls for many detailed answers. The Bulletin in which you find it contains several pages of helpful explanation. Study these directions and make sure you fill out the form accordingly.

If you wish to obtain college credit for participating in the CLEP program, it is important that you contact your college guidance department to learn what regulations govern the use of the tests at your school. College credit is awarded only by the colleges and universities that participate in the program. Although the tests are devised and administered by the College Entrance Examinations Board, the Board is not a college and does not give college credit. Colleges have their own policies regarding CLEP scores and it is your responsibility to find out what they are.

ADDRESSES OF INTEREST

For additional information or to arrange for a special administration of the test in regard to the General Examinations, write to Program Director, College-Level Examination Program, Box 592, Princeton, New Jersey 08540. You should ask for the following free booklets:

- CLEP General and Subject Examinations: Descriptions and Sample Questions
- CLEP Registration Guide
- CLEP Score Interpretation Guide
- CLEP Test Centers and Other Participating Institutions

Write to College Entrance Examinations Board, Box 592, Princeton, New Jersey 08540, or Box 1025, Berkeley, California 94701, for your copy of BULLETIN OF INFORMATION FOR CANDIDATES AND/OR A DESCRIPTION OF THE SUBJECT EXAMINATION.

If you are in the Armed Forces, CLEP Examinations are available to you at no charge through your education officer or by writing to U.S. Armed Forces Institute (USAFI), Madison, Wisconsin 53713.