

# Cal Poly Math 118

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Ex Quadratic Formula

a)  $\frac{a}{3}x^2 - \frac{b}{5}x - \frac{c}{7} = 0$   
 $x = \frac{-(-\frac{b}{5}) \pm \sqrt{(\frac{b}{5})^2 - 4(\frac{a}{3})(-\frac{c}{7})}}{2(\frac{a}{3})}$   
 $x = \frac{0.4 \pm \sqrt{0.16}}{6}$

b)  $\frac{a}{4}x^2 + \frac{b}{12}x + \frac{c}{6} = 0$   
 $x = \frac{-\frac{b}{12} \pm \sqrt{(\frac{b}{12})^2 - 4(\frac{a}{4})(\frac{c}{6})}}{2(\frac{a}{4})}$   
 $x = \frac{-\frac{12 \pm 0}{8}}{2}$   
 $x = -\frac{3}{2}$

Discriminant: quantity  $b^2 - 4ac$  that is under the square root sign in the quadratic formula; has the sign  $\Delta$

$ax^2 + bx + c = 0$  ( $a \neq 0$ ) is  $b^2 - 4ac$

1. if  $b^2 > 0$ , then equation has 2 real solutions
2. if  $b^2 = 0$ , then equation has 1 real solution
3. if  $b^2 < 0$ , then equation has no real solutions

Using the Discriminant

a)  $x^2 + 4x + 1 = 0$   
 $D = 4^2 - 4(1)(1) = 76 > 0$   
 has 2 real solutions

b)  $4x^2 - 12x + 9 = 0$   
 $D = (-12)^2 - 4(4)(9) = 0$   
 has 1 real solution

c)  $\frac{1}{3}x^2 - 2x + 4 = 0$   
 $D = (-2)^2 - 4(\frac{1}{3})(4) = -\frac{16}{3} < 0$   
 has no real solutions

The Path of a Projectile  
 $h = -16t^2 + v_0t$   
 An object thrown or fired straight upward at an initial speed of  $v_0$  ft/s will reach a height of  $h$  ft after  $t$  seconds.

Ex: The bullet is shot straight up w/ an initial speed of 300 ft/s

- When does the bullet fall back to ground level?
- When does it reach a height of 6400 ft?
- When does it reach a height of 2 mi?
- How high is the highest point the bullet reaches?

a) Ground level,  $h = 0$   
 $0 = -16t^2 + 300t$  or  $16t^2 - 300t = 0$   
 $0 = -16t(t - 18.75)$  exact  
 $t = 0$  or  $18.75$ . Bullet returns to ground after 18.75 s.

b) Two ways:  $2 = 6400 \text{ ft}$   
 $2 = -16t^2 + 300t$  or  $16t^2 - 300t + 6400 = 0$   
 $16t^2 - 300t + 6400 = 0$  or  $4t^2 - 75t + 1600 = 0$   
 $t^2 - 18.75t + 400 = 0$  Divide by 16  
 Discrimination of this equation:  $b^2 - 4ac = (-75)^2 - 4(16)(400) = 5625 - 25600 = -19975$   
 which is negative. The bullet never reaches 2 mi.

c) The bullet reaches 6400 after 10 s; again after 40 s.

d)  $16t^2 - 300t + h = 0$   
 $D = (-300)^2 - 4(16)h = 0$   
 $90000 - 64h = 0$   
 $h = 1406.25$   
 Maximum height is 1406.25 ft.

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Cal Poly Math 118 is a course offered at California Polytechnic State University, San Luis Obispo, designed to provide students with a solid foundation in mathematics, particularly for those pursuing degrees in various fields. This course is not only crucial for students in STEM disciplines but also plays a significant role in enhancing critical thinking and problem-solving skills. This article will delve into the structure, content, prerequisites, learning outcomes, and resources associated with Cal Poly Math 118.

# Course Overview

Cal Poly Math 118, titled "Mathematics for the Liberal Arts," is often taken by students in non-STEM majors who need to fulfill their general education requirements. The course is structured to cover essential mathematical concepts and their applications in real-life situations, encouraging students to appreciate the role of mathematics in everyday life.

## Course Content

The curriculum of Math 118 is designed to be accessible yet challenging, catering to students from various academic backgrounds. The following topics are typically covered in the course:

1. Mathematical Reasoning:

- Understanding logical arguments.
- Evaluating the validity of statements.
- Utilizing deductive and inductive reasoning.

2. Set Theory:

- Introduction to sets and their notation.
- Operations on sets (union, intersection, difference).
- Applications of set theory in various fields.

3. Functions and Graphs:

- Understanding the concept of a function.
- Types of functions (linear, quadratic, polynomial, exponential).
- Interpreting and sketching graphs.

4. Probability and Statistics:

- Basic concepts of probability.
- Descriptive statistics (mean, median, mode).
- Basic inferential statistics (confidence intervals, hypothesis testing).

5. Mathematics in Society:

- Applications of mathematics in economics and social sciences.
- The role of mathematics in decision-making processes.
- Ethical considerations in quantitative reasoning.

## Learning Outcomes

Upon successful completion of Cal Poly Math 118, students are expected to achieve the following learning outcomes:

- Develop a strong understanding of mathematical concepts relevant to liberal arts.

- Enhance problem-solving and critical thinking skills.
- Apply mathematical reasoning to real-world scenarios.
- Communicate mathematical ideas effectively.
- Analyze and interpret data using statistical methods.

## Prerequisites

While Math 118 is designed to be an entry-level course, there are certain prerequisites that students must meet before enrolling. Generally, students are expected to have:

- A satisfactory score on the Math Placement Exam.
- Completion of high school mathematics courses, including algebra and geometry.

Students who do not meet these prerequisites may be required to take a foundational math course before enrolling in Math 118.

## Instructional Methods

Cal Poly Math 118 employs a variety of instructional methods to engage students and enhance their learning experience. These may include:

- Lectures: Traditional classroom instruction that covers theoretical concepts and practical applications.
- Group Work: Collaborative activities that encourage peer-to-peer learning and the sharing of ideas.
- Technology Integration: Use of online tools and software to facilitate understanding and practice outside of the classroom.
- Hands-On Activities: Real-world problem-solving scenarios that require students to apply mathematical concepts in practical settings.

## Assessment and Grading

Assessment in Math 118 typically takes several forms to gauge student understanding and mastery of the material. Common components of the grading system may include:

- Homework Assignments: Regular assignments designed to reinforce concepts learned in class.
- Quizzes: Short assessments to evaluate understanding of specific topics.
- Midterm Exams: Comprehensive exams that cover material from the first half of the course.
- Final Exam: A cumulative assessment that tests knowledge from the entire

course.

Grades are generally assigned based on a percentage system, with specific weight given to each component of the assessment.

## Resources for Success

To succeed in Cal Poly Math 118, students are encouraged to utilize various resources available to them, including:

- Textbooks: The primary textbook will provide a comprehensive overview of the course material. Students should ensure they are using the correct edition recommended by the instructor.
- Online Resources: Websites like Khan Academy and Coursera offer supplementary materials and tutorials that can enhance understanding of mathematical concepts.
- Tutoring Services: Cal Poly provides tutoring resources through its Academic Skills Center, where students can receive additional help from peer tutors.
- Study Groups: Forming study groups with classmates can facilitate collaborative learning and provide different perspectives on problem-solving.
- Office Hours: Students are encouraged to take advantage of their instructor's office hours for personalized assistance and clarification of course content.

## Conclusion

Cal Poly Math 118 is a crucial course for students looking to strengthen their mathematical skills and apply these concepts to various disciplines. By covering essential topics and focusing on real-world applications, the course fosters critical thinking and equips students with the tools they need for academic and professional success. With diligent study, active participation, and the utilization of available resources, students can thrive in Math 118 and develop a lasting appreciation for mathematics in their lives. Whether pursuing a degree in the liberal arts or simply seeking to enhance their quantitative reasoning skills, Math 118 serves as a valuable stepping stone in the educational journey at Cal Poly.

## Frequently Asked Questions

### What topics are covered in Cal Poly Math 118?

Cal Poly Math 118 typically covers topics such as calculus, functions, limits, derivatives, integrals, and applications of differentiation and

integration.

**What is the prerequisite for enrolling in Math 118 at Cal Poly?**

The prerequisite for enrolling in Math 118 is usually a satisfactory score on the mathematics placement test or completion of a college-level precalculus course.

## What resources are available for students taking Math 118 at Cal Poly?

Students can access resources such as tutoring centers, online course materials, study groups, and office hours with professors to help with Math 118.

## How is Math 118 graded at Cal Poly?

Math 118 is typically graded based on a combination of homework assignments, quizzes, midterm exams, and a final exam, with specific weightings determined by the instructor.

**Are there any online components to Math 118 at Cal Poly?**

Yes, some sections of Math 118 may incorporate online components such as digital homework platforms, video lectures, or supplementary online resources to enhance the learning experience.

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