

# Mathematics Projects

## *What is a mathematics project?*

Maths projects range from simple demonstrations of mathematical problems, techniques, principles or well-known results to exciting discoveries of new concepts or theorems.

The scale of a project depends on the time factor. The final product could be in the form of a report or an exhibit.

## *Objectives*

- (1) Stretch students' intellectual thinking in mathematics.
- (2) Stimulate and promote interest in mathematics.
- (3) Encourage reading in mathematics.
- (4) Provide opportunities for students to do independent work either individually or as a team.
- (5) Learn how to collate relevant data and information from various sources.

- (6) Sharpen students' problem-solving skills.
- (7) Gain 'new' knowledge not contained in syllabus.
- (8) Taste what 'research' is like.
- (9) Learn how to organize the relevant materials and to compile, edit and write the report.
- (10) Experience how to present the findings and to answer queries and respond comments from others.

## *Criteria*

- (1) Problems are not too difficult to understand and do not require too much theory.
  - (2) Do require thinking and problem-solving heuristics.
  - (3) Interesting motivation or historical background.
  - (4) Relevance and applications.
- 

### **Others:**

Multi-disciplinary, no solution is known, reaching frontiers.

---

## *Stages*

- (1) Preparation of project topics.
- (2) Selection of projects by students.
- (3) Guidance during research period.
- (4) Submission of written reports.
- (5) Evaluation of reports.

## *Sources of project topics*

- (1) List of previous projects.
- (2) Books and pamphlets.
- (3) Magazines and periodicals.
- (4) Web sites and web materials.
- (5) Mathematical Societies.  
Eg, <http://www.ams.org/ams/mathmoments.html>

## ***Guidance***

- (1) Weekly or bi-weekly meetings with mentors.
- (2) Set a target.
- (3) Search for materials.
- (4) Study and discussion.
- (5) Selection of materials.
- (6) Preparation of a draft.
- (7) Final report.

## ***Written Report***

- (1) Title (precise and concise).
- (2) Introduction and motivation.
- (3) Notation and terminology.
- (4) Results, examples, proofs, remarks, significances and applications.

(5) Summary of results and conclusions.

(6) New problems and directions.

(7) Appendices.

(8) Acknowledgement.

(9) References.

---

## Some advice for supervisors

● **Form project groups according to the nature of the topics**

- *Number Systems*
- *Algebra*
- *Geometry & Trigonometry*
- *Permutations & Combinations*
- *Vectors*
- *Graph Theory*
- *Games*
- *Mathematical Designs*

*etc.*

- **Propose & identify suitable projects**

- *study & search*
- *get ideas from experts*

- **Be familiar with the problems involved**

- *motivation*
- *background*
- *contents*
- *possible applications*

- **Be aware of the quality & capability of the candidates**

- *Are the candidates good in problem-solving?*
- *Are the candidates good in explanation?*
- *Are the candidates good in presentation?*
- *Is the level just right?*

- **Enthuse & inspire**