



Goals

$$P \Rightarrow Q$$

By the end of this unit, students:

- understand the concepts and techniques in combinatorics, geometry and vectors
- apply reasoning skills and solve problems in combinatorics, geometry and vectors
- communicate their arguments and strategies when solving problems
- construct proofs in a variety of contexts including algebraic and geometric
- interpret mathematical information and ascertain the reasonableness of their solutions to problems.

This week's focus:

Nature of proof

- direct
- contraposition
- contradiction (De Morgan's)

Theoretical Components

STEP 1:

Readings:

Read examples: ABOUT/RESOURCES/2021 S1

It is vital that you watch the following videos to get an insight into Logic and Truth tables before attempting the exercises.

Logic Truth tables:

- <https://goo.gl/NZkJmA>
- <https://goo.gl/5vhLv9>
- <https://goo.gl/hxup4d>
-

Direct Proof:

- <http://goo.gl/TEu4C6>
- <https://goo.gl/RvndtG>

Proof by Contradiction:

- <https://goo.gl/GyJdY4>
- <https://goo.gl/Cnn2BJ>

Proof by Case:

- <https://goo.gl/NLHE3Z>

Practical Components

STEP 2:

Attempt all the questions:

- Check Google Classroom
- Exercises on Direct Proof:
<http://goo.gl/TEu4C6>

Investigation

STEP 4:

A: Prove that $\sqrt{5}$ is irrational.

B: Prove this theorem using an appropriate method.

“There are infinitely many prime numbers.”

(This theorem has been attributed to Euclid about 2300 years ago).

C: Prove the following statement:

“If n is an integer, then $3n^2 + n + 18$ is even.”

(20 marks – see the rubric for mark breakdown)

STEP 3:

Complete the Mathspace quiz by the end of WK03.

Q/F/O

(Quiz/Forum/Other)