

AN INVESTIGATION OF TRIGONOMETRIC REPRESENTATIONS AS A SOURCE OF STUDENT DIFFICULTIES

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Overview

- Positioning the study
 - defining representations
- The research questions
- Phases of the study
 - developing & analyzing representation networks
- Research results

Positioning the study

- Personal experience as a college teacher
- Revisions to the secondary school mathematics curriculum
- Current research results
- Literature review –
 - Difficulties with students transitioning in post-secondary mathematics
 - Value of representations in learning, communicating, applying mathematics – Goldin's definition of representation (2003)

Defining representations

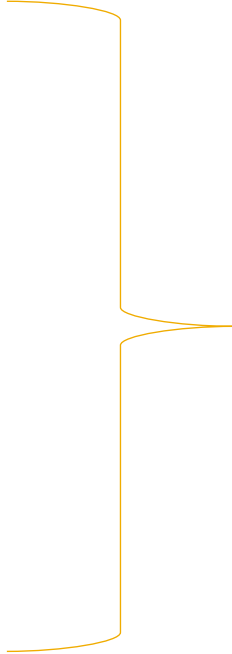
- “A **representation** is a configuration of signs, characters, icons, or objects that can somehow stand for, or “**represent**” something else ” (Goldin, 2003, p. 276).

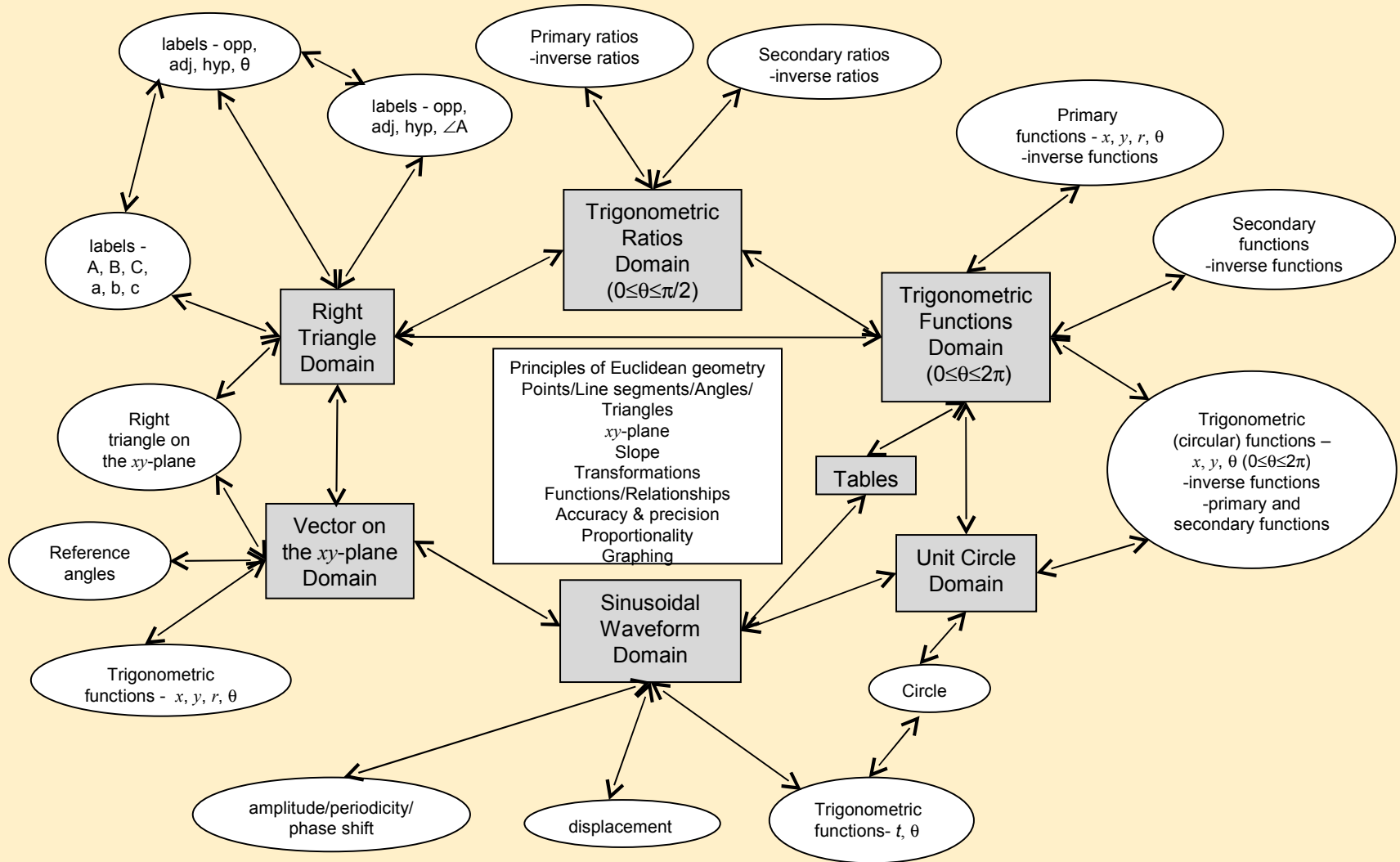
Research questions

1. What is the relationship between secondary and college technical mathematics treatment of trigonometry? In particular, how do the representations in secondary school college pathway courses compare to the representations used in a first semester college technology mathematics course?

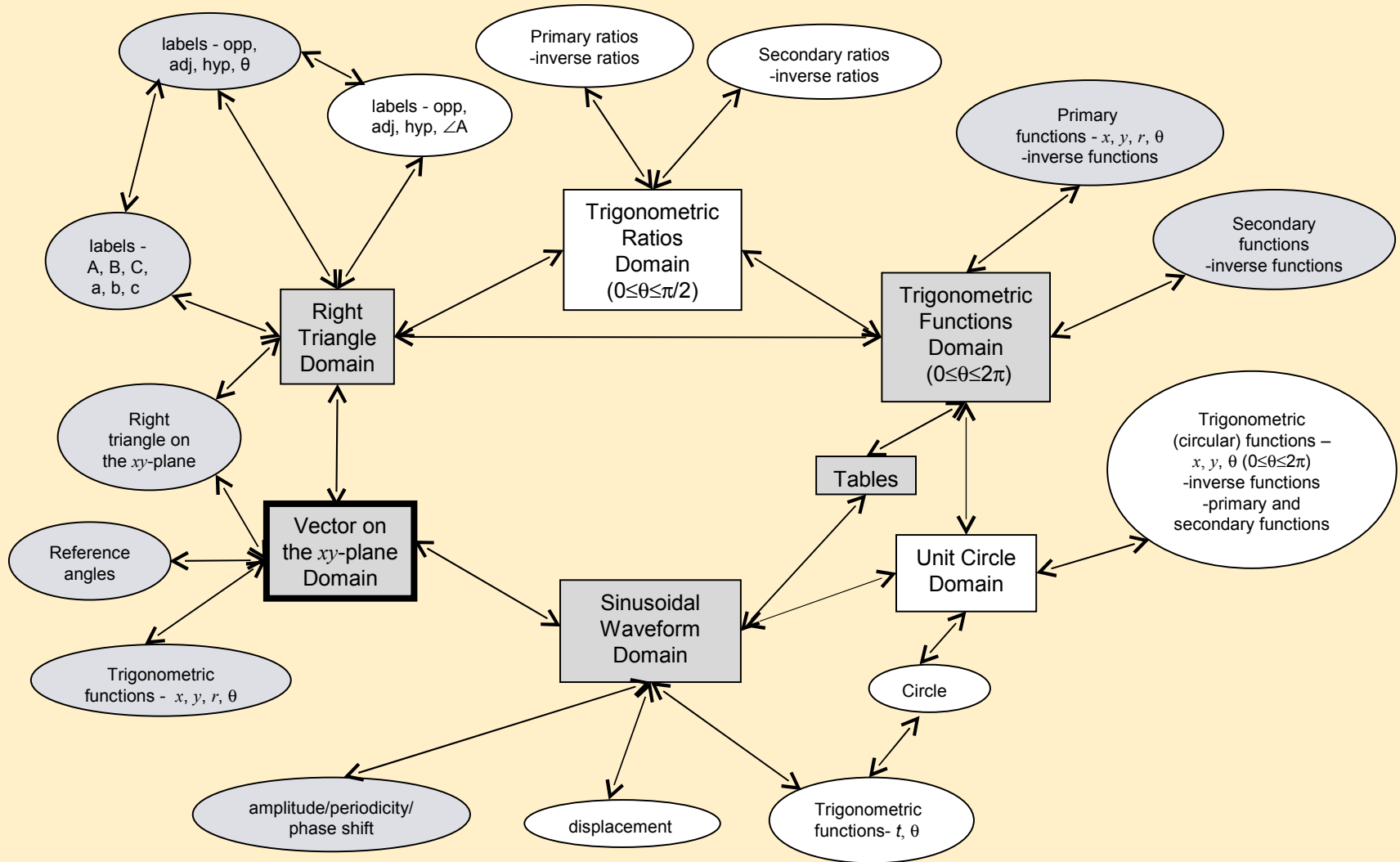
1. How can this research inform the teaching and learning of trigonometry in the secondary and college educational panels?

Phases of the study

- Phase 1:
 - Analysis of expert teacher interviews
 - Phase 2:
 - Analysis of post-secondary resource textbooks
- 
- General Representation Network of Trigonometry
 - Phase 3:
 - Analysis of secondary and college textbooks

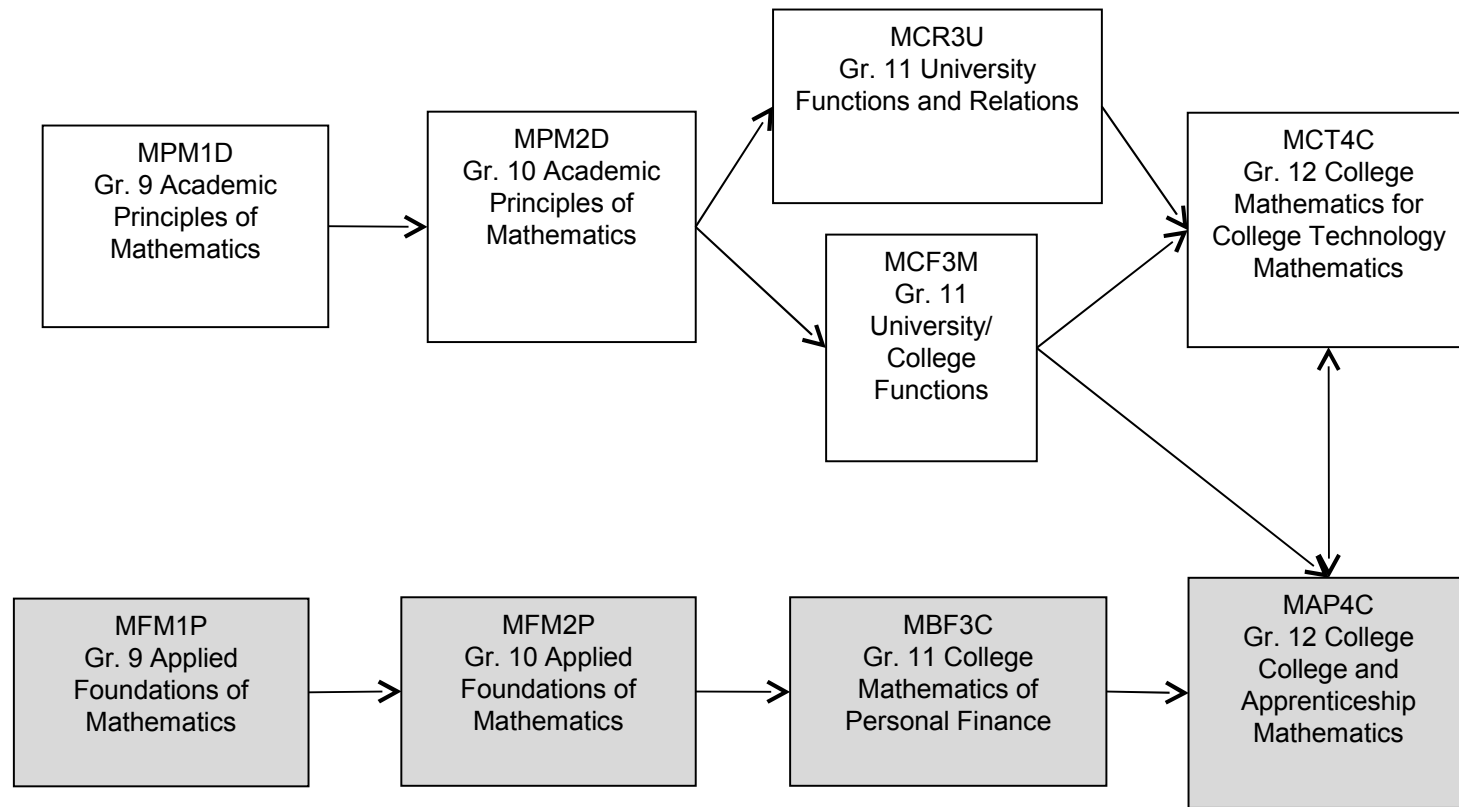


A general representation network of trigonometry.

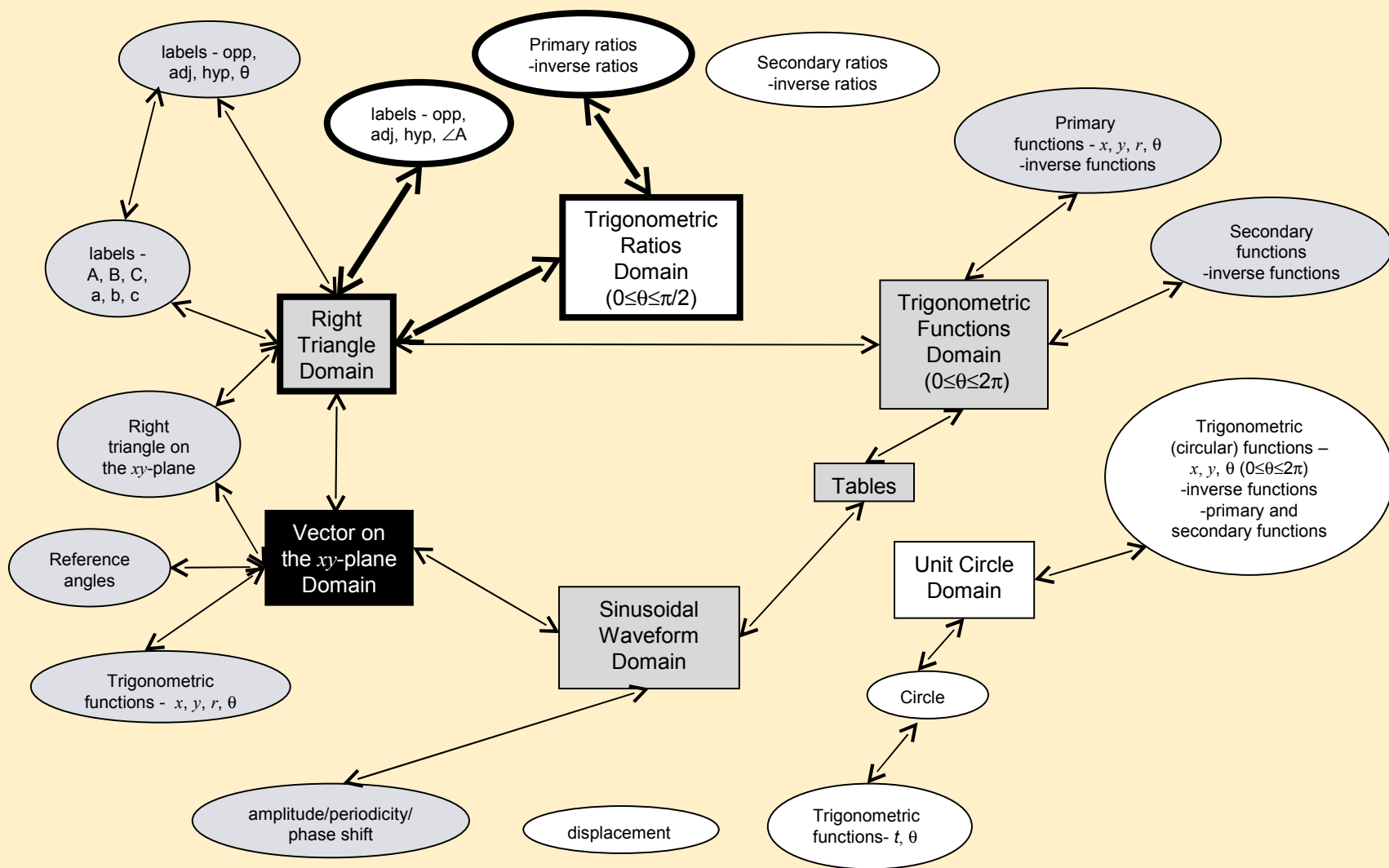


Building the representation network of trigonometry for pathway analysis – a college focus

Pathway 1



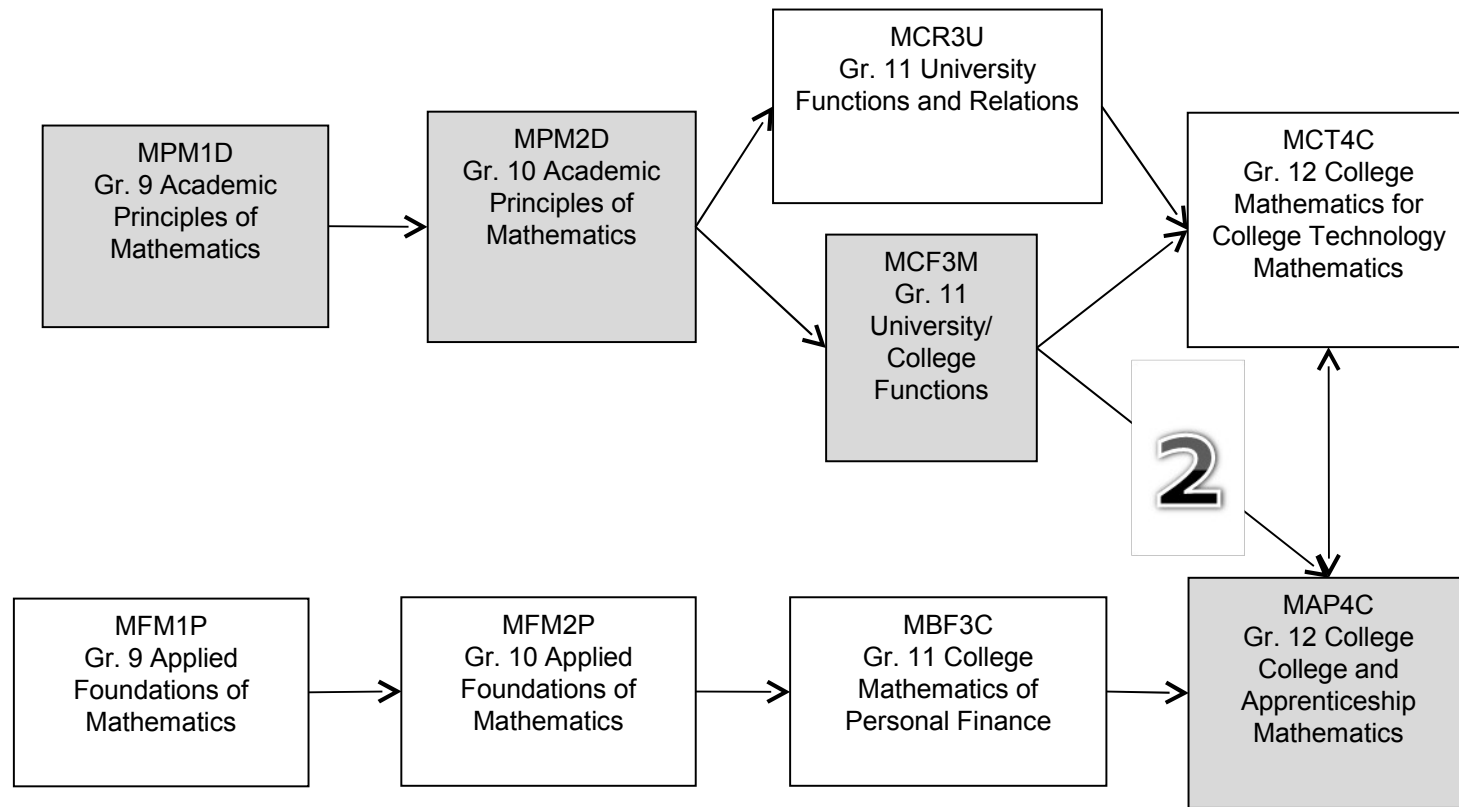
Secondary school mathematics pathways to college courses (adapted from Ministry of Education, 2000a) highlighting Pathway 1.



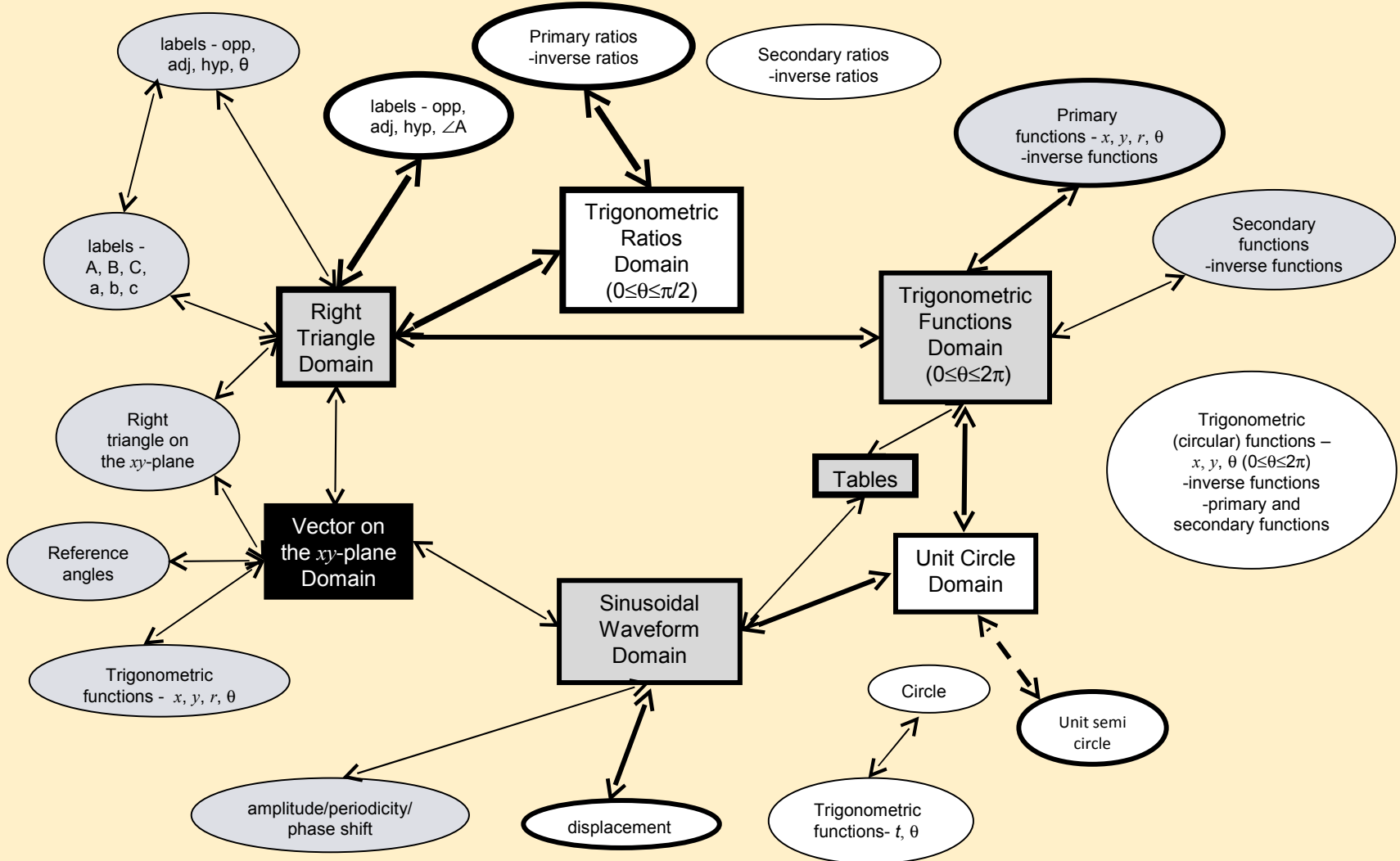
The representation network of trigonometry for Pathway 1.



Pathway 2

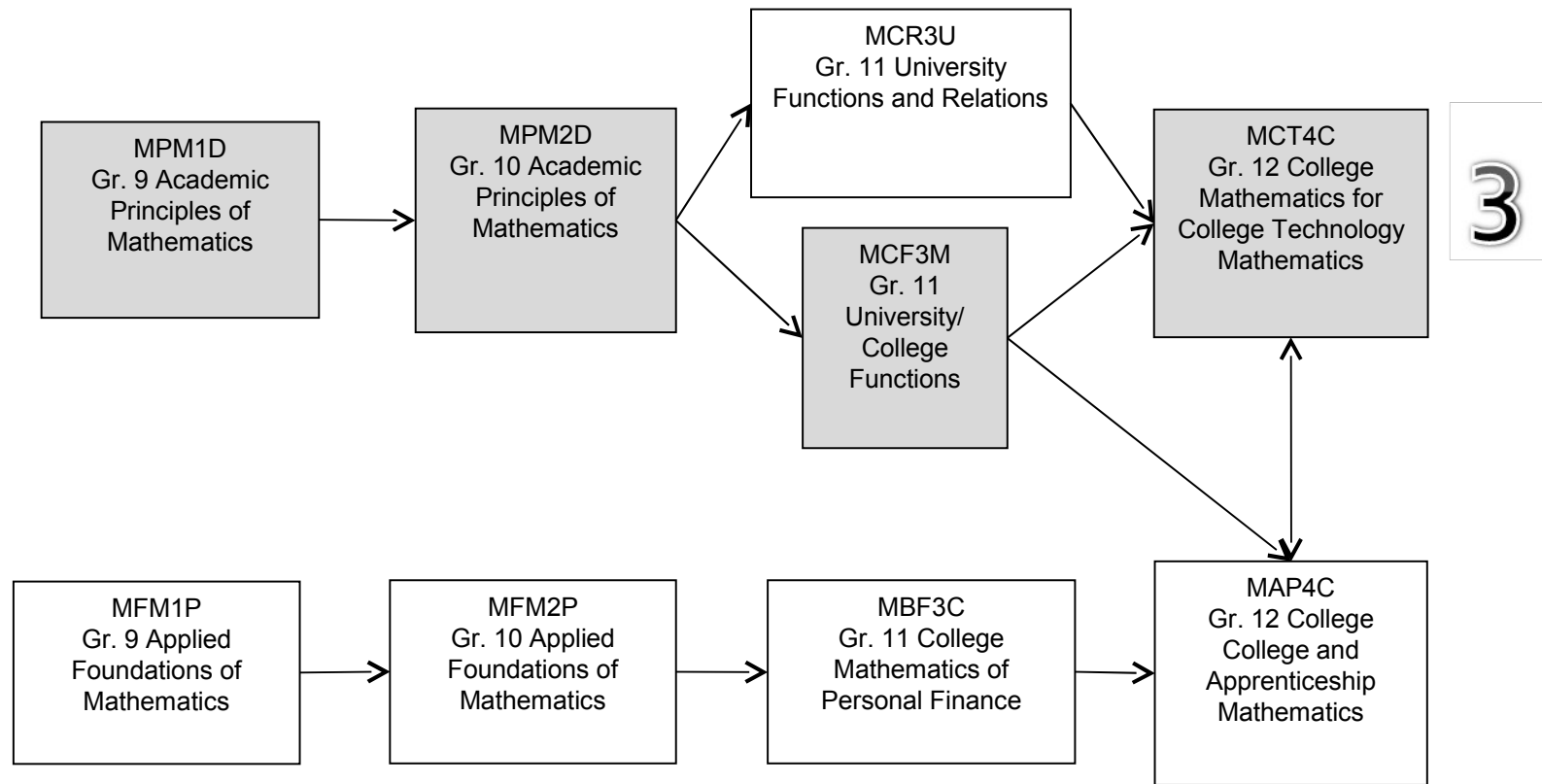


Secondary school mathematics pathways to college courses (adapted from Ministry of Education, 2000a) highlighting Pathway 2.

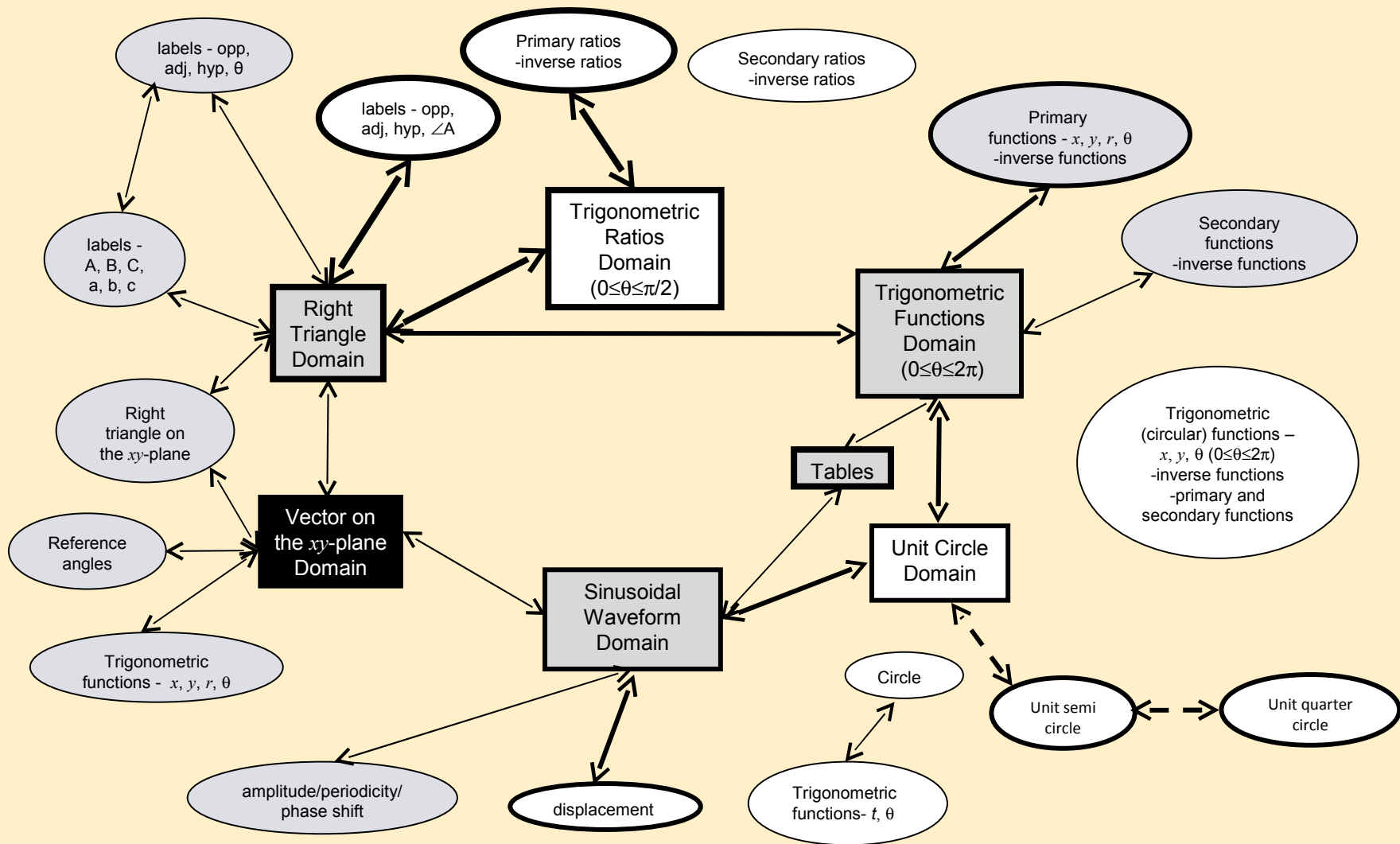


The representation network of trigonometry for Pathway 2.

Pathway 3



Secondary school mathematics pathways to college courses (adapted from Ministry of Education, 2000a) highlighting Pathway 3.



The representation network of trigonometry for Pathway 3.

Question 1 findings

- Textbook portrayal of representations
- The application of functions
- Labelling and measurement
- Pedagogical approaches

Question 2 findings

- Disconnections to prior knowledge
- Disruptions in secondary-college pathway networks
- Differences among notation, conventions, and symbols
- Different pedagogical approaches
- Evidence of critical correspondences
- Interconnected source domains

Recommendations

- Curriculum coordination across secondary school and college sectors
- Emphasis on appropriate course selection and secondary school pathway
- Implementation of an investigative approach in college courses