I. Topics

- Individual view on approaches and theories to learning (e.g., discovery learning, Gestalt psychology, problem-solving, hierarchical learning structures, constructivism)

- Differences in learning (e.g., gender, mathematical ability)

- Social/Cultural view–situated cognition, language, ethnomathematics

- Impact of teaching and attitudes on student achievement

- Meaning in the teaching of mathematics–learning mathematics with understanding

- Influence of constructivism in mathematics education

- Role of beliefs in learning and teaching

- Concept development

- Understanding, analyzing, and engaging in mathematics education research

II. References

- Carpenter, Dossey, & Koehler (Eds.). (2004). *CI-2.8. 7(d)-(h)-C(c)-AC.8 ,2 2 4f(v /BhFC)8/0 0 Td( )Tj/T1 1 Tf-*

I.    Topics

- Groth. (2013). *Teaching Mathematics in Grades 9-12: Developing Research-Based Instructional Practices*. Sage.

- Lester, F. (2010). *Teaching and Learning Mathematics: Translating Research for Secondary School Teachers*. Reston, VA: NCTM.

- Mathematical Sciences Education Board & National Research Council. (1990). *Reshaping School Mathematics: A Philosophy and Framework for Curriculum*. Washington DC: National Academies Press.

- National Assessment of Progress in Education. (2010). *National Assessment of Mathematics* [overlapping text illegible]

I.    Topics

- Issues concerning algebra and algebraic thinking in state and national curricular standards

- Learning and teaching algebraic thinking

- Assessment and remediation of common errors in algebra

- Exploring the Fundamental Theorem of Algebra and problem solving

- Exploration of content and method relative to all types of functions (e.g., radical, rational, exponential, linear)

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I. Topics

- Exploration into geometric proof, utilizing multiple approaches

- Learning and teaching geometric proof

- Assessment and remediation of common errors in geometry

- Exploration of content and method relative to key concepts in geometry (e.g., lateral area, surface area, volume, Pythagorean Theorem, trigonometric functions)

- Applications of all types of representations (e.g., algebraic expressions, graphing)

- Understanding content and applications of congruency, similarity, coordinate geometry

II. References

- California Mathematics Framework (2013, 2023): https://www.cde.ca.gov/ci/ma/cf/

- California Common Core State Standards for Mathematics (2010, 2013, 2014): https://www.cde.ca.gov/be/st/ss/documents/ccssmathstandardaug2013.pdf

- Common Core State Standards for Mathematics (2010): http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf

- Tomas, D. A. (2002). *Modern Geometry*. Brooks/Cole.

- Select NCTM Publications/Journal articles (e.g., *Navigating through Geometry, Grades 6-8*, 2002; *Navigating through Geometry, Grades 9-12*, 2002)

- Current high school and college geometry texts (e.g., *College Geometry: A Discovery Approach*, 2nd ed., 2001, by D. C. Kay)

I.   Topics

- The nature and process of mathematical modeling

- The role of modeling as a scientific endeavor

- The role of modeling in secondary school education

- Modeling curriculum, instructional practices, and student learning

- Linear models and linear regression, line fitting and approximation criteria

- Empirical modeling. Linearizable models

- Polynomial models, multiple regression

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I.  Topics

- Issues concerning probability and statistics in state and national curricular standards

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