SOME DEVELOPMENTAL MATH PROJECTS

CRAFTY PANEL ON
CONTEMPORARY APPROACHES TO INTERMEDIATE ALGEBRA
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INTERMEDIATE ALGEBRA INITIATIVES AT PIERCE COLLEGE

- **MAP** (Modeling and Algebra Project for Intermediate Algebra)
- **ASAP** (Combined elementary and intermediate algebra immersion)
- **STATWAY** (2-semester statistics for non-STEM)

Upon successful completion of Intermediate Algebra (Math 125) the student will be able to

- Represent and analyze basic functions and their applications using **tables, graphs, and equations**. Use and interpret function notation in both algebraic and graphical contexts.

- Write and analyze **linear models** for functions with constant rate of change. Graph linear equations and **interpret slope as a rate of change in real world situations**. Model problems involving two or more unknowns by writing and solving systems of equations or inequalities.

- Formulate and analyze **quadratic models**, such as projectile motion, revenue functions, problems involving area or the Pythagorean theorem, and applications of conic sections, such as planetary orbits.

- Apply and interpret **exponential models** such as population growth and compound interest, and **logarithmic scales** such as pH and earthquake magnitude.

- Use exponents and radicals to analyze **power function models** in applications such as direct and inverse variation and allometry (scaling in Physiology).

MODELING WITH ALGEBRA PROJECT

- Intermediate Algebra paired with "How to Succeed at Math" course
- Emphasis on student engagement in group work and directed learning activities
- Graphing calculator
- De-emphasis on lecture
- Videos for skills problems
- Skills Practice problems and Reading Questions scored in computer system

Lesson 1.4   Slope

Activity 1 Calculating Rate of Change

The graph shows how the thickness of a typical land-based glacier has changed over 43 years.
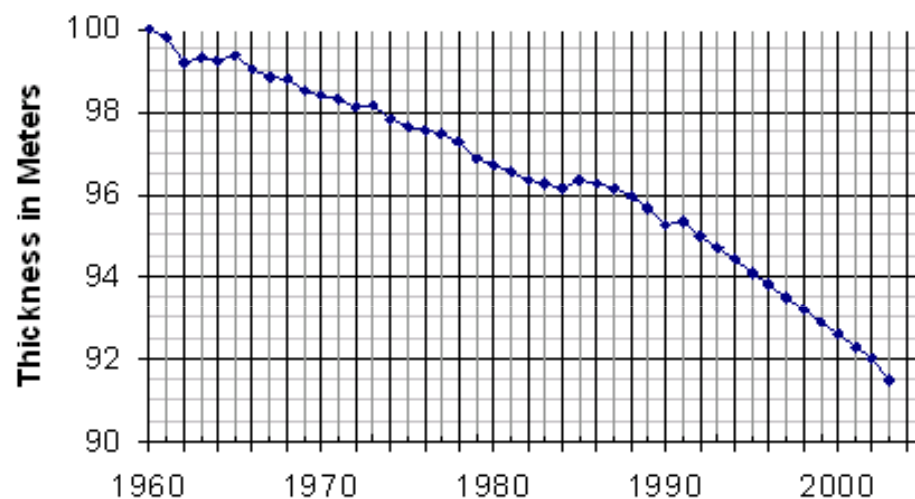
a. What was the **total change**, ΔH, in thickness from 1960 to 2003?

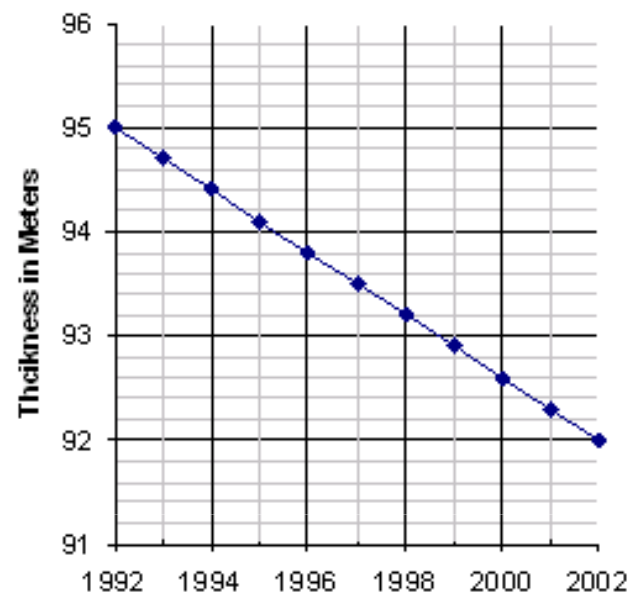| Year, t	Thickness, H
1960	
2003	

$\Delta H =$

Calculate the **average yearly change** in thickness, $\dfrac{\Delta H}{\Delta t}$, over that time interval. Give units with your answers.

b. The graph appears to be almost linear from 1992 to 2002. Read the graph to complete the table.

Year, t	Thickness, H
1992	
2002	

c. Calculate the slope of the graph from 1992 to 2002. Include units in your answer.

d. What does the slope tell us about glaciers?

MAP Successes

- High scores on department common assessment: Average score 64.2 vs 52.6 for all Algebra 2

- MAP success at transfer level: 75% compared to 62.5% overall

- Reading Questions encourage students to read before coming to class

- Activities and Concept Questions engage students

- Focus on applications increases writing ability and critical thinking without detracting from mastery of skills

ASAP

- **Algebra Success At Pierce – Get through your algebra classes ASAP!**

- **Learning-community-style cohorts**

- **Course has four components:**
  - **Elementary Algebra (5 units),**
  - **Intermediate Algebra (5 units),**
  - **Math study skills unit (1 unit),**
  - **College success class (3 units),**
  - **Total units: 14**

ASAP vs. Non-ASAP Success and Persistence

	Enrolled in Elementary Algebra	Successful in Elementary Algebra	%	Enrolled in Intermediate Algebra	%	Successful in Intermediate Algebra	%
ASAP	535	400	74.8%	(535)		351	**65.6%**
Non-ASAP	6100	3558	58.3%	2014	33.0%	1396	**22.9%**

ASAP Materials

- **Combined /blended textbook by Pierce faculty**
  - Directed learning activities
  - Wide variety of problems
  - Emphasis on graphical reasoning and applications
  - Rule of four: verbal, numerical, graphical, and algebraic descriptions of models
- **Graphing calculator**
- **Math Study Skills booklet for 1 unit study skills class**

Support for ASAP

- **Personal Development class taught by counselor**
- **Each class has a TA who:**
  - **Helps students with activities in class**
  - **Tutors outside of class**
  - **Advises and supports students**
  - **Paid by Basic Skills Initiative**
- **One Fall 2012 section of Intro Stats is reserved for spring 2012 ASAP students.**

Statway™

- A project of the Carnegie Foundation for the Advancement of Teaching—Pierce is one of the pilot 19 community colleges.

- Students in Statway™ start at the level of elementary algebra and get "to-and-through" college level statistics in one year.

- Designed for non-STEM students whose only university math requirement is a single course in statistics

- Developmental math in the service of statistics: Statway™ does NOT cover intermediate nor even elementary algebra.

Statway™ Learning Philosophy Principles

- A "rich task" or overarching question motivates the development of concepts.

- Mathematical tools are introduced as needed.

- Lessons focus on fewer topics in greater depth.

- Materials stress conceptual understanding over procedural fluency.

- Technology is used for calculation.

STATWAY™ ISSUES FROM FIRST YEAR:

- The reading level of the materials was 12, above the comfort zone of most of our developmental students.
- The lessons are challenging, not easy, which surprised most students. (Recruitment adjustments needed!)
- The materials provided by the Carnegie Foundation were not yet ready for wide use, so Pierce faculty had to make many modifications.

THANKS!

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