

MathNerds Mentoring Networks

A MathNerds Mentoring Network is a free (grant supported) service using web-based technology to connect university students to grades 5-12 students by allowing a class (or classes) of grades 5-12 students to ask questions of a class (or classes) of university students.

Vision Statement

For local school district students who have math questions (especially while they attempt homework problems), and for university class students (primarily future teachers and mathematics majors) who need direct contact with school district students so that they might better understand both the content and the students, the Mathematics Mentoring Network is an internet-based application that will:

- accept questions and attempted solutions from school district students,
- relay those questions to an individual or a group of university class students, and
- deliver responses back after they are reviewed by both university faculty and the school district teacher.

Unlike other internet-based homework services, our product will provide school district students with responses (not answers) from a trusted group of university class students trained in inquiry-based learning philosophy, while future teachers and mathematics majors gain invaluable experiences through question/response exchanges with the school district students.

Introduction to MathNerds

- MathNerds = non-profit = 501©3
- MathNerds (est. 1996) provides free question-and-response service through network of volunteers
 - responds to 1500 questions per month
 - 97% of questions within 16 hours
 - 800 volunteers have contributed time
- Mentoring Networks expand mission of spreading the pedagogy of inquiry-based learning in mathematics by reaching both university and school students

Network Features

- School district students ask questions which are routed to university student(s)
- University students may collaborate or work individually (instructor's choice)
- University professor may review work at any time and release the solution to school district student or send it back to the university student(s) for more work
- Student names may be anonymous
- Email addresses are optional

Examples of Networks

- James Madison \leftrightarrow Harrison ISD
 - Entire high school
 - AP calculus \leftrightarrow Capstone
 - AP calculus \leftrightarrow Lamar Analysis
- Texas State University \leftrightarrow
 - San Marcos ISD
 - St. Michael's Indian School
 - Remedial University Classes
- Lamar University Math Club
 \leftrightarrow Coleman and Dayton ISD

Benefits to Students

- Grades 5-12 students receive a free mathematical service promoting phrasing good questions and have (safe) contact with university students
- Future teachers/math majors
 - experience the questions their future students will really ask
 - gain exposure to a new pedagogical tool (IBL) for addressing these questions

University Student Quotes

- I had no real idea what the kids would be studying and the advanced nature of it was interesting and surprising.
- I did learn how to explain things in different ways, geared towards the child's individual needs.
- Kids are bright! They also respond best when encouragement is given along with help.
- I need to practice my world (sic) problem solving skills!
- I learned that mathematics can be hard to explain and especially hard over the computer.

Benefits to University Faculty

- Mathematician develops relationships with mathematics educator
- Mathematics educator
 - exposes his or her students to inquiry-based pedagogy using current, questions asked by real students
 - fosters a relationship with local school districts and teachers
 - Works closely with mathematician

Benefits to School Teacher

- add a powerful support mechanism for students
- become familiar with an internationally recognized mathematics education resource
- meet regularly with a mathematics educator at the local university
- have access to a mathematician at the local university
- introduce students to concept of attending university

Features

1. Individual or group work
2. Release to group or release to professor
3. University professor or school district teacher can release questions
4. University professor can reject with comments
5. Names optional
6. Email addresses optional
7. Student profiles
8. Mathematical palettes

A School District Teacher's Perspective

- **Students get extra practice and help**
- **Very little extra paperwork for you**
- **Grant Possibilities**
- **Helps students verbalize questions ...moving away from “I don’t get it!”**
- **Fun for the kids and easy for you**
- **Classroom behavior control feature**

School District Teacher Quote

Ted,

The quality of your program merits any extra effort I can afford it, the executive director of my school is very impressed as I am. What a tremendous instructional tool that is not bound by geographical distance. I hope the Meadows foundation will realize what an educational asset this program is and the potential it has.

Jim

Acknowledgements and Contacts

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- www.mathnerds.com – click on Networks

Acknowledgements and Contacts (continued)

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Rolla, University of East Anglia UG, School Bangladesh, Pantano Restaurant NY, Drake University, United States Military Academy NY, Imperial College London, University of Kentucky, University of Rochester NY, Midlands Technical College SC, University of Colorado at Boulder Colorado, University of North Texas Texas, University of California Los Angeles, LaRue County KY, Kenyon Ocean Lakes Math & Science Magnet Academy, TRW Colorado, Ratna Junior College, Mercer University Georgia, Cedarville University OH, Union College NY, University of California, Davis, X-Ware Arizona, MIT, University of Alabama in Huntsville, University of Winnipeg Manitoba, Lee College, University of Chicago, US Govt, McDermott, Washington University, Akamai Technologies, The University of Akron School of Law OH, Ohio State University, Christian Heritage Academy, St. Xavier, The Malawi Polytechnic, Seattle Central Community College, Independent Learning Centre - TV Ontario, Air Force, Spheres Academic Services, SUNY Plattsburgh NY, O&A Associates, Hardin-Simmons University, Syracuse University, Temple University PA, University of Missouri-Columbia, Trinity College South Australia, Latvian University, University of Wisconsin, Ragnarsson College Sweden, PROS Strategic Solutions TX, Sul Ross State University, Communtiy College of Philadelphia Pennsylvania, Georgia Institute of Technology, Sharp University of Bath UK, Peel Board of Education Ontario, Reed College, Mathworks DC, UC Berkeley CA, Central Missouri State University, University of Iowa, Carnegie Mellon University, Youngstown State University, Grand Valley State University, Cornell University, Montclair State University, Woodcliff Academy, Bedford Central School District NY, Mitretek Systems VA, Carmike Cinemas TN, Harvard MA, West Chester University Pennsylvania, Chicago Public Schools, Truman College, University of Arizona, Emory and Henry College, Birkenhead School, National Cancer Institute, Locke Martin, Politechnics Bucharest Romania, National Institute of Education, Republic of Singapore, Manhattan Gymnastics Center

Practice Question

Question:

How do you change slope intercept form to standard form?

Work Done:

$$y=6x+12$$

$$6x=12+-12=y+12$$

$$6x=y+12$$

$$6x/6=y/6+12/6$$

$$x=1/6y+2$$

Is this right?

Practice Question

Question:

What exactly makes the slope of a vertical line undefined?

Work Done:

Slope of a vertical line is $1/0$. Is it undefined because you can't divide anything into 0 (or no) pieces?

Question-and-Response Guidelines

- Start with a positive comment.
- Do not give the answer.
- Give enough, but not more.
- Give a little extra mathematics.
- Put yourself in the student's shoes.
- Ask a question of the student.
- Lead the client back.

Thank You

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