G-TEAMS at Mountain View High School

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Who we are

Matt Reynolds is a mathematics teacher extraordinaire at MVHS, currently teaching College Ready Mathematics and Honors Algebra II.

Jordan Allen-Flowers is a graduate student working on applications of mathematics to optical sciences.

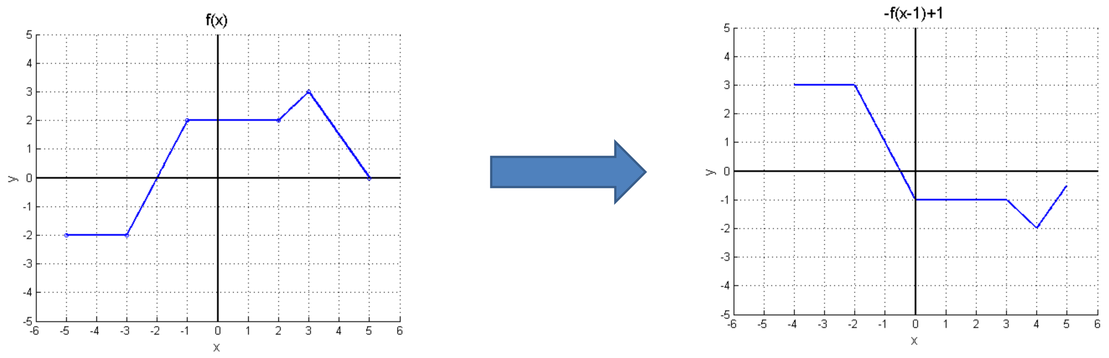
What we do

We work together to develop lessons and activities that attempt to excite students about mathematics. We write assignments that force them to think critically about the underlying ideas, and we try to incorporate science and modeling whenever there is a chance.

College Ready Math

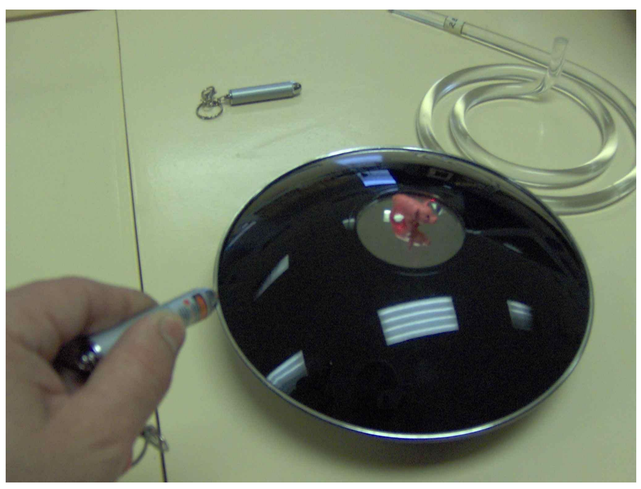
Transformations of functions:

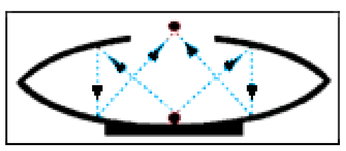
Students had an inquiry-based assignment to investigate the order in which function transformations are applied to generate a new graph. The assignment was challenging, but it forced students to think critically, rather than memorize an algorithm.



Conic sections:

While learning about conic sections, students had the opportunity to see a parabolic mirror in action.





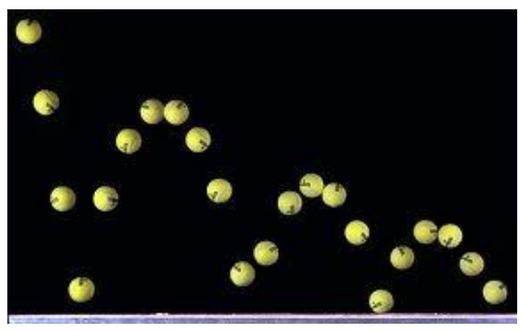
Question: if you want the image to appear 8 cm above the bottom mirror and 1 cm above the top mirror, what diameter do the mirrors need to have?

Using their knowledge of the geometric properties of parabolas, the students had to explain how the parabolic mirror works and calculate the focal lengths.

Honors Algebra II

Projectile motion:

Students investigated hands-on the quadratic dependence of the height *h* of a tennis ball on its flight time *t.* This gave the students a first introduction to experimental science and mathematical modeling, two topics which are often thought of as disjoint in high school mathematics and science classes. Students were able to calculate the initial velocity of a thrown ball, and the maximum height of a bounced ball.

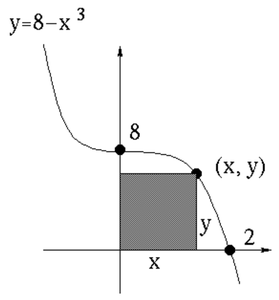


$$v = v_0 + at$$

$$h = h_0 + v_0 t + \frac{1}{2} a t^2$$

Optimization:

As part of the unit on solving and graphing polynomial equations, honors students were introduced to the concept of tangent lines and the mechanics of taking derivatives. The purpose is to be able to calculate local maxima and minima when plotting polynomials, as well as to apply the ideas to optimization problems that are not based on linear programming.



Question: a rectangle is to be formed with one corner on the origin and the opposite corner on the graph of $y = 8 - x^3$. What is the largest area such a rectangle can have?

Academic Decathlon

Jordan is the mathematics coach for the MVHS Academic Decathlon. The themes this year are combinatorics, algebra, and statistics. The topics are covered more deeply than what is seen in most high school classes, and have been both a challenge and a pleasure to teach. Jordan is responsible for all lesson planning, classroom instruction, homework assignments, and quizzing.

The Academic Decathlon team is hard at work taking a practice exam. They recently scored 9th place in the Regional Competition, and will compete next at the state level.