

"Prodigious!"

Quadratic equations and Vertical motion

Mathematical Concepts Explored	Technology Used	Commands/Functions Utilized
<ul style="list-style-type: none"> • solving quadratic equations • graphs of quadratic equations • vertical motion 	<ul style="list-style-type: none"> • graphing calculator • spreadsheet 	<ul style="list-style-type: none"> • y= • graph/table • trace • formula • fill

California Mathematics Content Standards Addressed by this Activity

Algebra

- Standard 14.0 Students solve a quadratic equation by factoring
- Standard 20.0 Students use the quadratic formula to solve quadratic equations
- Standard 21.0 Students graph quadratic functions and know that their roots are the x-intercepts
- Standard 23.0 Students apply quadratic equations to physical problems, such as the motion of an object under the force of gravity

Prerequisite skills

Algebra: Students need to be proficient using factoring to solve quadratic equations. They should recognize the roots of a quadratic equation on a graph. Also, they should have been exposed to the quadratic formula.

Technology: Students should be proficient at graphing equations using the graphing calculator. Additionally, they should have some basic spreadsheet skills including entering formulas.

Activity Agenda, Teacher Notes and Points for Discussion

Teacher will...	Student will...
1. show clip from movie "October Sky"	watch quietly and attentively
2. lead short discussion about movie clip; introduce vertical motion function	listen attentively, offer insightful comments
3. hand out and lead students through worksheet; model and guide through technology use	work diligently, intensely focused on their work; ask for assistance as needed
4. follow up worksheet completion with summation discussion	listen attentively, offer insightful comments
	shower teacher with compliments and gifts

Follow-Up Activity

Watch entire movie "October Sky." Eat popcorn with extra butter.
(Provide napkins.)

Possible Extensions/Changes to this Activity

- Students build and launch their own rockets. Use math to find unknowns such as maximum height and initial velocity. Students then write equations to model their rocket's path.
- Students use technology (CBL or CBR) to get data from a vertical motion model. They then use data to find an equation to model the motion.
- Advanced students can be exposed to vectors and learn the concepts of horizontal and vertical velocity