



MATH AND SCIENCE @ WORK

AP* CALCULUS Educator Edition



SPACE SHUTTLE ASCENT

Instructional Objectives

Students will

- create and analyze scatter plots given a table;
- find regression functions using a graphing technology;
- apply the first derivative test to find local extrema;
- find inflection points to analyze the concavity of a function; and
- make connections to real world problems.

Degree of Difficulty

This problem requires students to have a good understanding of the TI-Nspire handheld. Students will also be connecting data and making multiple conjectures relating graphs and tables to a real life situation.

- For the average AP Calculus AB student the problem may be moderate to very difficult depending on their experience with the TI-Nspire.
- For the average AP Calculus BC student the problem may be moderately difficult.

Media Resources

This problem has two media files for use during the introduction and post discussion of the problem. These files will engage students in a space shuttle launch and introduce them to the different events that take place during the space shuttle's ascent into space.

- Space Shuttle Launch Video (10 minutes). This video shows the launch of Space Shuttle Discovery STS 121 mission on July 4, 2006. To access the video, follow the link provided and choose the video titled: "The Rocket's Red Glare." This should be shown to students during the introduction of the problem and is necessary for them to answer part of the problem. It is highly recommended that the instructor become familiar with the video before showing it to students.

http://www.nasa.gov/mission_pages/shuttle/shuttlemissions/sts121/launch/sts121-allvideos.html

Appendix A provides a discussion guide that can be used with the video.

Grade Level
11-12

Key Topic
Applications of Differentiation

Degree of Difficulty
Calculus AB:
Moderate to Difficult
Calculus BC: Moderate

Teacher Prep Time
10 minutes

Problem Duration
60-90 minutes

Technology
TI-Nspire Handheld, computer with projector and movie player

Materials
Student Edition including:
- Background handout
- Problem worksheet
- ShuttleAscent.tns

NCTM Principles and Standards
- Algebra
- Data Analysis and Probability
- Problem Solving
- Communication

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