

Full Speed Ahead: A Day 1 Calculus Activity

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Brief Video: <https://youtu.be/7YIhNfK1Fe0>

- What questions come to mind as you watch the video?
- Share your questions with your neighbor.

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Choose a question and have the students think about it.

- “Write down your best gut guess for the answer.”
- “Write down a guess that is too high. Too low.”
- “What is the highest guess? Lowest guess?”

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Work together toward a solution

- “What information do you need from me?”
- Question their questions.
- Have them question each other.
- Make them carefully think about the details of the question.

Further investigation

Time (s)	Position (in)
141.39	0.00
141.49	0.00
141.55	0.00
141.74	0.75
141.93	4.85
142.09	8.90
142.13	13.25
142.39	17.75

Further investigation

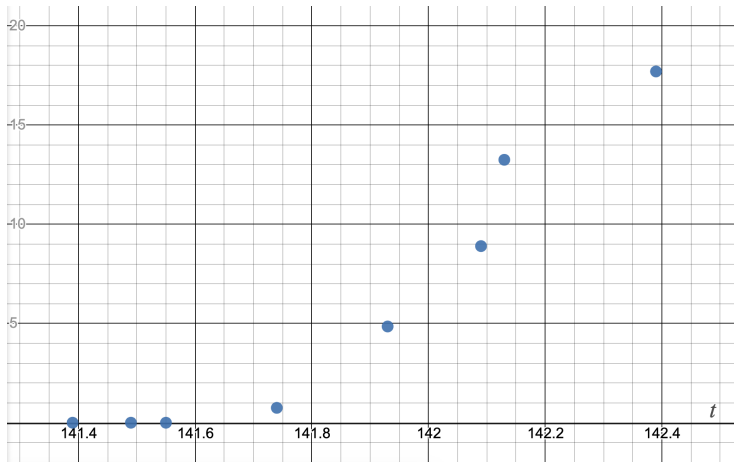
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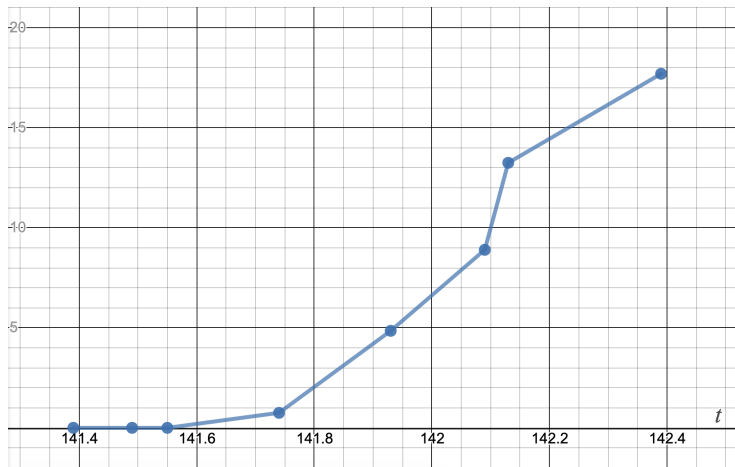
Average velocity over the time interval $[141.74, 142.39]$ is about 26.15 inches per second. How many miles per hour is that?

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Average velocity over the time interval $[141.74, 142.39]$ is about 26.15 inches per second. How many miles per hour is that? (≈ 1.5 mph)





Benefits

On day 1 students will...

- ask their own question,
- work with their peers,
- present ideas and solutions,
- discuss aspects of modeling, and
- establish a context and an intuition for calculus concepts.

Active Calculus

Matthew Boelkins

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Active Calculus: Our Goals

Features of the Text

Students! Read this!

Instructors! Read this!

1 Understanding the Derivative

How do we measure velocity?

The notion of limit

The derivative of a function at a point

The derivative function

Chapter 1 Understanding the Derivative

1.1 How do we measure velocity? ▶

1.2 The notion of limit ▶

1.3 The derivative of a function at a point ▶

1.4 The derivative function ▶

Three-Act Math

Dan Meyer: <https://blog.mrmeyer.com/>

Act One

- Show the students something visual and have them pose questions.
- Should require little to no literacy from the students.
- Have students guess answers to posed questions.

Three-Act Math

Dan Meyer: <https://blog.mrmeyer.com/>

Act Two

- Have students model the problem. They should develop language and common definitions as a class.
- Make sure students are precise with their questions and answers. What units are we using?
- Have students discover the answers to their questions on their own. For example, they can get the position/time data themselves from the video.
- Explain and illuminate bigger ideas. For example, the difference between average velocity and instantaneous velocity.

Three-Act Math

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Act Three

- Show the (an) answer to the question(s).
- Discuss other questions that may have been brought up in act one.
- Give a sequel task. For example, show a video where a car goes back and forth over time.

Thank you!
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