VELOCITY AND TANGENT LINE APPROXIMATION

Throw a ball across the room, and designate a timer.

- How do we compute the speed of the ball? Answer: Distance/Time

- Draw a straight line. The slope of the line is equal to the speed of the ball.

- But the ball isn't moving at a constant speed the entire time, so our graph is wrong.

- How can we measure the speed of the ball at any given second? (and get a better picture of what's happening to the ball?)

  – Time it over a shorter interval.

- Pick someone to stand between, and time.

- If we keep adding more and more people, eventually our graph starts to look like this...

- The point is that we can approximate the actual, real-life graph by linear functions.

- For each segment, we get an approximation of the speed of the ball at that instant.

- As our time intervals shrinks to zero, (if you draw out the full line, not just the segment), we see the tangent line. The slope of the tangent line is the ***instantaneous velocity*** of the ball.

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