

## Average and Instantaneous Speed

p. 93 - 97 (2.1)

# 1

**Average Speed** is defined by the total distance travelled  $d$  divided by the elapsed time period  $t$ .

Graphically, the average speed is the slope of the secant line.

Analytically, average speed =  $\frac{\Delta d}{\Delta t}$

**Instantaneous Speed** is defined by the speed at a specific instant in time.

Graphically, the instantaneous speed is the slope of the tangent line.

Analytically, we need *calculus* to determine this instantaneous speed.

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(calc.)1. A roller coaster has its largest drop modeled by the equation  $d(t) = 1.93t^3 - 31.82t^2 + 113.83t + 158.65$  where  $d(t)$  is measured in feet and time  $t$  is measured in seconds.

- a) What is the average speed of the roller coaster from 2 seconds to 8 seconds?
  
  
  
  
  
  
  
  
  
  
- b) What is the average speed of the roller coaster from 4 seconds to 6 seconds?
  
  
  
  
  
  
  
  
  
  
- c) Estimate the instantaneous speed of the roller coaster at exactly 5 seconds.