

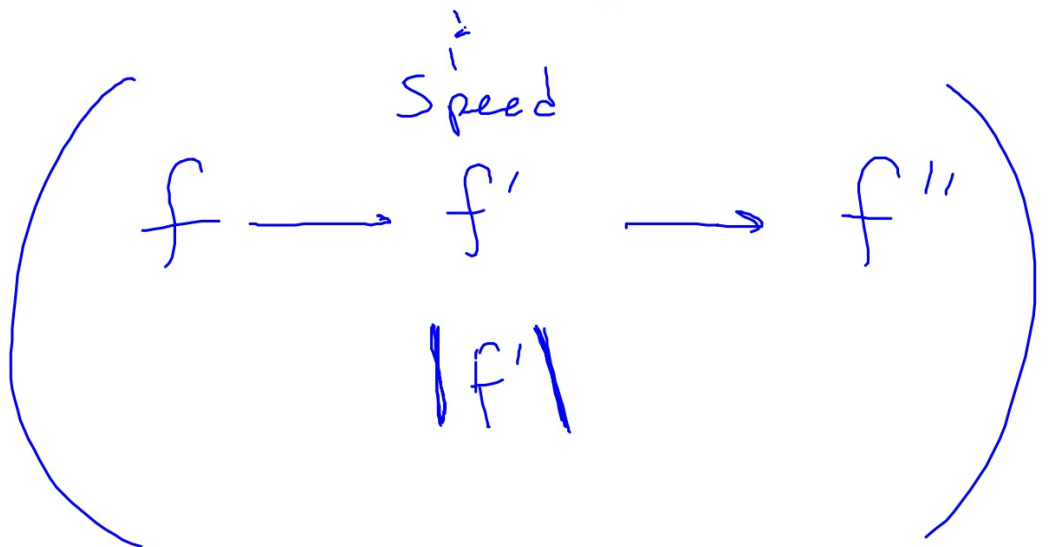
Goals: Tan lines game



Position  $\rightarrow$  Velocity  $\rightarrow$  acceleration

Hw

take home  
test  
due  
tom



If  $x(t)$  is measured in feet,  
then what unit is  $x'(t)$ ?

$$\frac{dx}{dt} = \frac{ft}{time}$$

$x(t)$  position

$x'(t)$  ft/sec

Velocity → First deriv. of position  
tells direction

0-60m/h

in 5.2 sec

acceleration:

Speed = absolute value of velocity.

$$\frac{\text{Velocity}}{\text{time}} = \frac{\text{pos/time}}{\text{time}}$$

Second Derivative of position

<u>function</u>	<u>What it measures</u>	<u>unit</u>
<ul style="list-style-type: none"> <li><math>x(t)</math></li> </ul>	Position	distance
<ul style="list-style-type: none"> <li> <math>x'(t)</math>  <math>\frac{dx}{dt}</math> </li> <li><math>v(t)</math></li> </ul>	Velocity Speed: $ v(t) $	$\frac{\text{distance}}{\text{time}}$
<ul style="list-style-type: none"> <li> <math>x''(t)</math>  "double prime"  <math>\frac{d^2x}{dt^2}</math>  "Second derivative" </li> <li><math>a(t)</math></li> </ul>	acceleration	$\frac{\text{distance}}{\text{time}^2}$

$$12) \quad s = t^3 - 6t^2 + 9t \quad \text{meters}$$

$$s'(t) = v(t) = 3t^2 - 12t + 9 \quad \text{m/sec}$$

$$0 = 3(t^2 - 4t + 3)$$

$$0 = 3(t-3)(t-1)$$

$$v'(t) = s''(t) = a(t) = 6t - 12 \quad [t=3, t=1]$$

$$a(3) = 6$$

$$a(1) = -6$$