

## RELATIONSHIPS BETWEEN POSITION, VELOCITY, AND ACCELERATION (§3.4)

Position =  $s(t)$

Velocity =  $v(t)$

Acceleration =  $a(t)$

Velocity is the rate of change of position

$$v(t) = s'(t)$$

Acceleration is the rate of change of velocity (or the second derivative of position)

$$a(t) = v'(t) = s''(t)$$

- Velocity and Acceleration indicate direction (+ or -)
- An object changes direction when the velocity changes sign.
- An object is speeding up when velocity and acceleration have the same sign.
- An object is slowing down when velocity and acceleration have different signs.
- An object is stopped when velocity = 0.