Acceleration: How quickly velocity changes:

- Acceleration occurs when something SPEEDS UP, SLOWS DOWN, or CHANGES DIRECTION (in other words, whenever velocity changes).
- Acceleration is the rate at which this change occurs:

$$a = \frac{v - v_0}{t}$$

- Acceleration has direction - so all answers should include units and the direction given in the problem.

UNITS: m/s^2 + DIRECTION

If You Know...	You Can Find...	By Using ...	Units/Direction
v_0 (initial vel.) v (final vel.) t (time)	a (acceleration)	$a = \frac{(v - v_0)}{t}$	m/s^2 + DIR.
v_0, a, t	v	$v = v_0 + at$	m/s + DIR.
v, a, t	v_0	$v_0 = v - at$	m/s + DIR.
v_0, v, a	t	$t = \frac{(v - v_0)}{a}$	s

A rocket-powered derby racer is roaring down a ramp. Its velocity increases from 0.87 m/s to 1.12 m/s. If it takes 0.4 seconds for this velocity change to occur, how quickly was the derby racer accelerating?

#) ① $v_0 = 0.87$ m/s down a ramp, $v = 1.12$ m/s down a ramp, $t = 0.4$ s

② a

③ $a = \frac{(v - v_0)}{t}$

④ $a = \frac{(1.12 - 0.87)}{0.4} = 0.625$

⑤ $a = 0.625$ m/s² down a ramp