Derby Racers:

- Last work day in class: Mon. 1/9
- Data collection: Wed. 1/11
- Writeup/analysis: Fri. 1/13

DERBY RACER AND
WRITEUP DUE ON
FRIDAY, 1/13 (end of period)

Rearranging the acceleration equation

$$a = \frac{(v_f - v_0)}{t}$$

If you know $\boxed{v_f, v_0, \text{ and } t}$ $\textcircled{1a}$

Use this equation (no rearranging)

to find $\boxed{a}$ $\textcircled{1b}$

(1a) you know a, v_f, and time

(1b) you can find v_0

⋮

(4) $1.5 \cdot 8 = \dfrac{(12 - v_0)}{\cancel{1.5}} \cdot \cancel{1.5}$

$v_0 + 12 = 12 - v_0 + v_0$

$v_0 + 12 = 12 - 12$
-12

$\boxed{v_0 = 0 \ \dfrac{m}{s}}$

• multiply both sides by t

• add v_0 to both sides

• subtract $a \cdot t$ from both sides

(5) $a = \dfrac{(v_f - v_0)}{t}$

$a = \dfrac{(12 - 0)}{1.5}$

$= \dfrac{12}{1.5} = 8$ ✓

(1a) You know a, v_0, t

(1b) You want v_f

(4) $4 \cdot 10 = \dfrac{(v_f - 2)}{4} \cdot 4$

$2 + 40 = v_f - 2 + 2$ · multiply both sides by t

$42 = v_f$ · add v_0 to both sides

$$v_f = 42 \dfrac{m}{s}$$

(1a) You know v_f, v_o, a

(1b) You want t

(4) $t \cdot 15 = \dfrac{(30-10)}{t} \cdot t$

$15t = 30 - 10$

$\dfrac{15t}{15} = \dfrac{20}{15}$

· Multiply both sides by t

· divide both sides by a

$t = \dfrac{20}{15}$

$\boxed{t = 1.333 \text{ s}}$