Acceleration Problems

$$a = (v_f - v_0)/t$$

v_f [−] ~~v_0~~ [÷] t

v_f [−] v_0 [=] [÷] t ✓

[(] v_f [−] v_0 [)] [÷] t ✓

Units of Acceleration

$$\frac{v_f - v_0}{t} \quad \frac{m/s}{s} \quad \frac{m}{s \cdot s} \quad \frac{m}{s^2}$$

m/s/s

meters per second per second

EXAMPLE: A giant sloth is slinking down the road at 9.7 meters per second to the south. It spies a distant pile of worms. LUNCH! After 14 seconds go by, the sloth is now moving at 32 meters per second to the south. What was the giant sloth's acceleration?

1a $v_0 = 9.7\ m/s$ $t = 14\ s$ $v_f = 32\ m/s$

1b $a = ?$

2 $a = \frac{v_f - v_0}{t}$ $a = (v_f - v_0)/t$

3 $a = \frac{32 - 9.7}{14}$

4 $a = \frac{22.3}{14} = \boxed{1.593\ m/s^2\ \text{SOUTH}}$

5 $a = \frac{v_f - v_0}{t}$

$1.593 = \frac{32 - 9.7}{t}$

$(t) \cdot 1.593 = \frac{22.3}{t} \cdot (t)$

$\frac{1.593 \cdot t}{1.593} = \frac{22.3}{1.593}$

$(1)(t) = 13.99$

$t = 13.99$ ✓