

Velocity Vs Time graphs

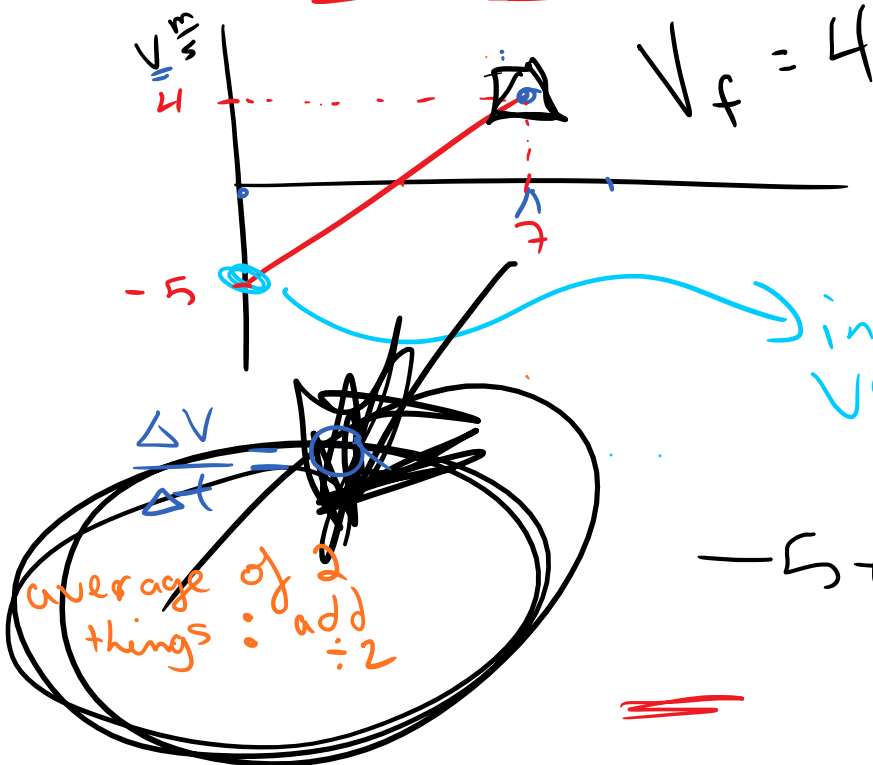
Thursday, September 30, 2010 2:23 PM

check
Axes
every
time

Similar to Displacement vs. time but different.

NEVER CONFUSE V vs. t WITH D vs. t GRAPHS

= 28m



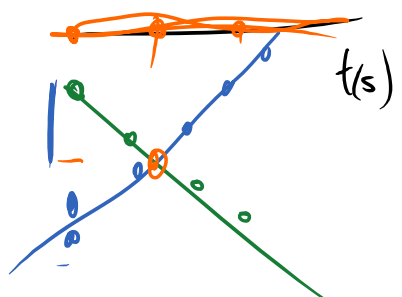
$V_f = 4$

initial
velocity

$V_o = -5$
 V_i

$$-5 + 4 = \frac{-1}{2} = -0.5 \frac{m}{s}$$

- a) forward deceleration
- b) backward acceleration
- c) backward deceleration
- d) at rest



Slope of v vs. t

$\frac{\Delta y}{\Delta x} \leftarrow \frac{\Delta V}{\Delta t} = \begin{matrix} \text{accel} + \\ \text{or} \\ \text{decel} - \end{matrix}$

$\frac{\Delta d}{\Delta t} = v$ $\frac{\Delta v}{\Delta t} = a$

Kinematic Equations ← equations of motion

$\Delta d = v_{\text{average}} \cdot t$ $\frac{\Delta v}{\Delta t} = a$

$\frac{\Delta d}{\Delta t} = v_{\text{average}}$
 $\frac{\Delta d}{\Delta t} = \frac{1}{2}(v_0 + v_f)$
 $d = \frac{1}{2}(v_0 + v_f)t$
 $2ad = (v_0 + v_f)(v_f - v_0)$
 $2ad = v_f^2 - v_0^2$
 $v_0^2 + 2ad = v_f^2$

$\frac{\Delta v}{\Delta t} = a$
 $\frac{v_f - v_0}{t} = a$
 $v_f = v_0 + at$
 $v_f - v_0 = at$

1-4 p66

$v_0 \cdot v_f = v_0 v_f$
 $v_f^2 - v_0^2 = (v_f - v_0)(v_f + v_0)$

$2ad = v_f^2 - v_0^2$
 when t is missing $\rightarrow v_0^2 + 2ad = v_f^2$

$d = \frac{1}{2}(v_0 + v_f)t$
 $d = \frac{1}{2}(v_0 + at + v_0)t$
 $d = \frac{1}{2}(2v_0 + at)t$
 $d = (v_0 + \frac{1}{2}at)t$
 $d = v_0 t + \frac{1}{2}at^2$
 use when v_f is missing

6 R 5
 2
 3
 t(s)
 4 8
 7

A cat initially at rest is kicked and travels a displacement of 12.0 m in 4.0 s, what is The cat's acceleration?

$v_0 = 0$
 $d = 12$
 $t = 4$
 $a = ?$
 $d = v_0 t + \frac{1}{2}at^2$
 $12 = 0 + \frac{1}{2}a(4)^2$
 $12 = 8a$

$$t = 4$$
$$a = ?$$
$$1-4 \text{ p66}$$

$$12 = \cancel{v} + 2 \cdot \dots$$
$$\frac{12}{2} = \cancel{v} + a$$
$$a = 1.5 \frac{\text{m}}{\text{s}^2}$$

t
c

The area of a velocity vs time graph:

d

o

The area of a velocity vs time graph represent the displacement of the object.

Any time you have a graph the area represent the product of you axes variables.

Find the displacement of the object on the graph below after 10 s: