Changing Velocity & Acceleration

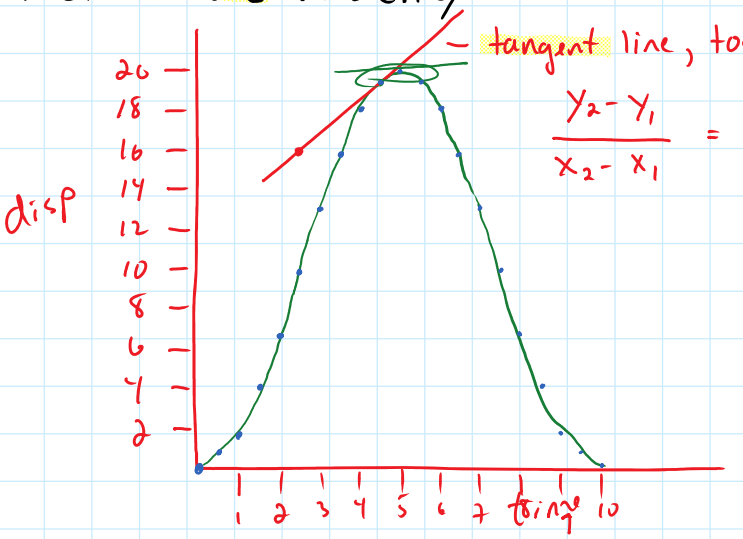
Thursday, September 14, 2017 12:33 PM

Review Questions

1) 2 trains, 6km apart approach each other on seperate tracks at 70km/H each. How long til they meet

2) Drive a car at 80km/H for 3hrs, then 60km/H for 2 hours. Find ave velocity

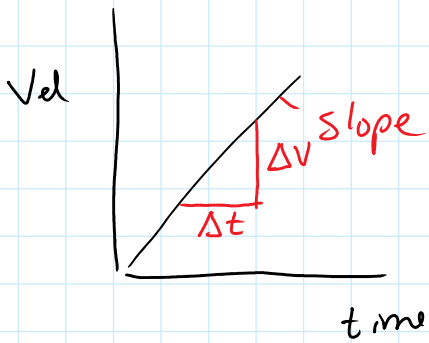
Instantaneous Velocity



tangent line, touch a curve at only 1 point

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{19.5 - 16}{4.5 - 2.5} = \frac{3.5}{2} = 1.75 m/s$$

Acceleration - when velocity changes



slope = acc

$= \frac{rise}{run} = \frac{\Delta v}{\Delta t}$

Δ change, final - initial

$\Delta v = v_f - v_o$

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

units $\frac{m/s}{s}$, m/s^2

$a = \frac{v_f - v_o}{t}$

$at = v_f - v_o$

$$v_f = v_o + at$$

ex A car acc from 20m/s to 50m/s in 5.0sec. Find the acc.

$V_0 = 20\,m/s$
$V_f = 50\,m/s$
$t = 5.0\,s$
$a = ?$

$$a = \frac{\Delta V}{\Delta t} = \frac{V_f - V_0}{t}$$
$$= \frac{50\,m/s - 20\,m/s}{5\,s} = \frac{30\,m/s}{5\,s} = 6\,m/s^2$$

ex Determine the final velocity of a cyclist who starts from rest and acc at $2.5\,m/s^2$ for 6 s.

$a = 2.5\,m/s^2$
$t = 6\,s$
$V_0 = 0\,m/s$
$V_f = ?$