

PROBLEM 2-49

Note Title

8/30/2007

Given.

Car 1

Car 2

$$t = 0$$

$$t = 0$$

$$x_{01} = 0$$

$$x_{02} = +1000 \text{ m}$$

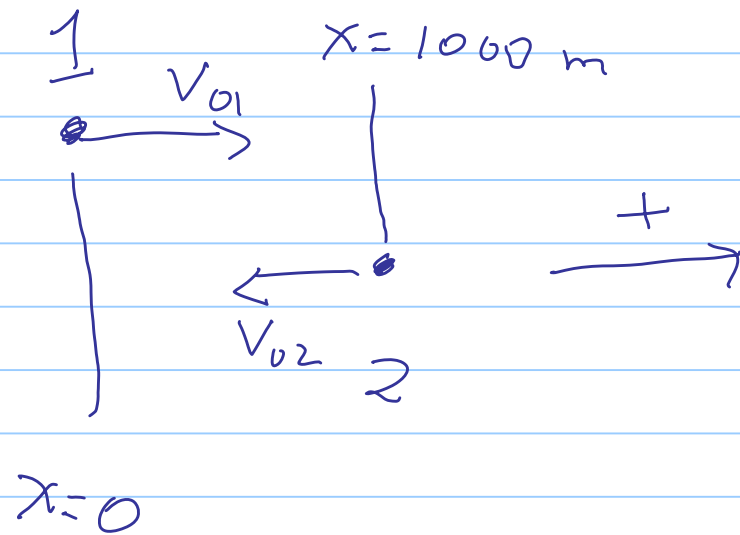
$$v_{01} = +20 \frac{\text{m}}{\text{s}}$$

$$v_{02} = -30 \frac{\text{m}}{\text{s}}$$

$$a_1 = +2.5 \frac{\text{m}}{\text{s}^2}$$

$$a_2 = +3.2 \frac{\text{m}}{\text{s}^2}$$

GOAL: Write $x_1(t) + x_2(t)$.



$$X = X_0 + V_0 t + \frac{1}{2} a t^2$$

$$X_1 = X_{01} + V_{01} t + \frac{1}{2} a_1 t^2$$

$$X_1 = 0 + \left(20 \frac{\text{m}}{\text{s}}\right) t + \frac{1}{2} \left(2,5 \frac{\text{m}}{\text{s}^2}\right) t^2$$

a)
$$X_2 = 1000 \text{m} + \left(-30 \frac{\text{m}}{\text{s}}\right) t + \frac{1}{2} \left(3,2 \frac{\text{m}}{\text{s}^2}\right) t^2$$

b)

Plot on calculator + find

Intersection

Solve for t in one; plus into other

Set equal to other + solve quadratic

E. 2.1 # 25 Review exercise

Given: $V_{OB} = 2 V_{OA}$
 $a_A = a_B = -1.8 \frac{m}{s^2}$

$y_A = 0$

$y_B = 0$

$y = 0$

V_{OA}

(A)

(B)

V_{OB}

$y_{OA} = y_{OB} = 0$

$V_A = V_B = 0$



GOAL: FIND $\frac{V_B}{V_A}$

$$V^2 = V_0^2 + 2a(x - x_0)$$

$$\cancel{V}_A^2 = \cancel{V}_{0A}^2 + 2a_A(y_A - \cancel{y}_{0A})$$

$$\cancel{V}_B^2 = \cancel{V}_{0B}^2 + 2a_B(y_B - \cancel{y}_{0B})$$

$$y_B = - \frac{V_{OB}^2}{2a_B}$$

$$y_A = - \frac{V_{OA}^2}{2a_A}$$

$$\frac{y_B}{y_A} = \frac{V_{OB}^2}{V_{OA}^2} = \frac{(2V_{OA})^2}{V_{OA}^2} = 4$$