

Drive You Buggy!

Standards: Data Acquisition, Data Analysis, Reasoning, and Problem Solving.

Two (2) motorized dune buggies (any vehicle which moves with a constant velocity will

9850GaPlus

[RUN] and [GRAPH]

Problem: Car A leaves the origin (going right) at the same time that car B leaves a point 3 m to the right of the origin, going left. Find, 1) At what position (from the origin) will the two cars pass each other? and 2) At what time does this occur?

Time car A and car B over a known distance several times. **Calculate** the average of each car's times.

Using the average times and known distances, **calculate** each car's respective velocity. (Be careful here, re-read problem to insure that you write down correct velocities.)

$$\text{Example: } V_a = 3 \text{ m} / 9 \text{ s} = 0.33 \text{ m/s (right)} = +0.33 \text{ m/s}$$

$$V_b = 3 \text{ m} / 4.5 \text{ s} = 0.66 \text{ m/s (left)} = -0.66 \text{ m/s}$$

Write down the specific equation for each car's position:

$$\text{Car A: } x = (0.33 \text{ m/s})t$$

$$\text{Car B: } x = (-0.66 \text{ m/s})t + 3 \text{ m}$$

Graph these two (2) equations on your calculator at the same time.

1) From the main menu, go to the **Graph** (5) menu. In the G-Func. screen, enter **[0.33 x]** for y_1 and press **EXE**. Now enter **[-0.66 x + 3]** for y_2 , press **EXE**. Press **F6** (DRAW) to draw both graphs.

2) Press **F5** (G-Solv), and then press **F5** (ISCT) again to find the point of intersection.

$$\begin{aligned} \text{Example (Cont.): } x \text{ (time)} &= 3.03 \text{ seconds} \\ y \text{ (Position)} &= 1.0 \text{ meters} \end{aligned}$$

These results are the solution to the above sample problem.

A) At what position, will the cars pass each other? ans. - 1 m to the right of the origin.

B) At what time will this occur? ans. - 3.03 seconds from the time you released the cars.

3) Set up dune buggies in problem configuration and **test** problem solutions.