

3.09 Use systems of linear equations or inequalities in two variables to solve problems. Determine the solution by:

- a) Graphing.
- b) Substitution.
- c) Elimination.

A. Olympic Swimming (B-53)

With the Olympics occurring every two years (alternating summer and winter games), there are several events in which both men and women compete. For instance, there are winning results for men and women in the 400 meter free-style swimming since 1924. Working in pairs, students will select (or be assigned) an event. Using their calculators, they would determine best-fit linear equations for each of the men's and women's data. If appropriate, use the equations to determine men's and women's performances for 1940 and 1944. (Why were there no results those years?) Predict the winning results for the next several Olympics. Ask the students to determine, according to their calculations, if the women's performance will ever equal or exceed the men's performance in their event. Research as to whether this is likely to happen. At the 2004 Athens Olympics the winning times in the 400 meter free-style events were 223.10 seconds for the men and 245.34 seconds for the women.

- B. Have students research the transportation costs for travel between cities. Assume that the costs identified represent a linear trend. Here is an example (01/11/03).

	distance (round trip)	car	air	rail
Raleigh-Charlotte	300 miles	\$108	\$224	\$40
Raleigh-New York	1300 miles	\$468	\$169	\$147

Determine the distance at which driving a car is less expensive than riding the train. When does it become cheaper to fly rather than drive? For what distance is the train the most expensive mode of travel? Identify some advantages and disadvantages for each mode of transportation. What other variables affect the cost of travel?

- C. Select two linear equations and enter them on the calculator. (Example: $Y1 = x - 4$ and $Y2 = -x + 3$) Graph, trace, and identify the intersection. Verify with substitution. Record the graph and coordinates of the intersection. Have students try other pairs of equations and record results. Use a friendly range for best results.