## Algebraic reasoning

# Buy One, Get one Free

The local poster store is having a Buy One, Get One Free sale on popular posters. When you buy a poster, you get the second one of the same or lesser value for free. Your task is to find out how to get the best deal.

Finding the best or optimum solution to practical problems is the basis of the branch of mathematics called *linear programming*. It is used in the field of *operations research*, which studies problems involving complex systems in business management, economic planning, and many other areas.

## MATERIALS

calculators

scratch paper

pencils

## WHAT'S THE MATH?

Comparing prices;
developing a strategy
for an optimum plan.

### How

• The regular prices for the eight posters that interest you are:

| | |
|---|---|
| Rock Star | $43 |
| Movie Star | 35 |
| Sports Hero | 40 |
| Politician | 11 |
| Travel | 8 |
| Classic Movie | 25 |
| Old Advertisement | 20 |
| Nostalgia | 13 |

*Please email your responses to your Math teacher.*

• You decide you want one of each. You ask the clerk to pair the posters so that you get the next highest-priced poster free for each of the four posters you will pay for.

• As the clerk is working, his boss comes along and says that if you buy eight posters at once you will only get the four cheapest posters free! How does this affect your previous plan?

• Would it be worth coming in and buying only two posters at a time on each of four days? What difference would it make?

• A friend offers to help. She will choose four posters (two to pay for and the cheaper two for free) and you can choose four (two to pay for and two for free). Which four should each of you buy to save the most money?

Is there another plan that would save you more money? ■

### Extension

• Bring information about a local sale. Discuss how to save the most money.