

**PROBLEM SOLVING STEPS:**

- 1) UNDERSTAND the problem
  - Reread it, choose variables to be the unknowns, construct a drawing
- 2) TRANSLATE the problem into two equations
  - Both in  $y = mx + b$  form to graph or solve by substitution
- 3) SOLVE the system of equations
  - Graphing, substitution, or elimination
- 4) INTERPRET the results
  - Put the answer in terms of the scenario of the word problem
- 5) CHECK the proposed solution in the stated problem
  - Is your answer possible, does it make sense?

**OBJECTIVE 1: Solving Problems Modeled by Systems of Two Equations**

HINTS:

- Read the problem carefully
- Cross out information you do not need
- Do NOT use the same information more than once

TASK 1: Solving a Problem about Prices

The Cirque du Soleil show Varekai is performing locally. Matinee admission for 4 adults and 2 children is \$374, while admission for 2 adults and 3 children is \$285.

$$\begin{array}{r}
 x = \$ \text{adult ticket} \\
 y = \$ \text{children ticket} \\
 4x + 2y = 374 \\
 2x + 3y = 285
 \end{array}$$

$$\begin{array}{r}
 4x + 2y = 374 \\
 -4x - 6y = -570 \\
 \hline
 -4y = -196 \\
 \quad \quad \quad -4 \quad \quad \quad y = 49
 \end{array}$$

$$\begin{array}{r}
 2x + 3(49) = 285 \\
 2x + 147 = 285 \\
 2x = 138 \\
 x = 69
 \end{array}$$

a) What is the price of an adult's ticket? **\$69**

b) What is the price of a child's ticket? **\$49**

c) Suppose that a special rate of \$1000 is offered for groups of 20 persons. Should a group of 4 adults and 16 children use the group rate? Why or why not?

$$4x + 16y = 1000 \Rightarrow 4(69) + 16(49) = 1060$$

**1060 > 1000**      **yes, take the group rate price, and save \$60.**

TASK 2: Rangers vs Yankees/Red Sox

It is considered a premium game when the Red Sox or the Yankees come to Texas to play the Rangers. Admission for one of these games for three adults and three children under 14 is \$75, while admission for two adults and four children is \$62.

$$\begin{aligned} x &= \text{\$ adult ticket} \\ y &= \text{\$ child ticket} \end{aligned}$$

$$\begin{array}{r} -2(3x + 3y = 75) \\ 3(2x + 4y = 62) \\ \hline -6x - 6y = -150 \\ 6x + 12y = 186 \\ \hline 6y = 36 \\ \boxed{y = 6} \end{array}$$

$$\begin{aligned} 3x + 3y &= 75 \\ 2x + 4y &= 62 \end{aligned}$$

$$\begin{aligned} 2x + 4(6) &= 62 \\ 2x + 24 &= 62 \\ 2x &= 38 \\ \boxed{x = 19} \end{aligned}$$

a) What is the price of an adult's admission? **\$19**

b) What is the price of a child's admission? **\$6**

c) Suppose that a special rate of \$200 is offered for groups of 20 persons. Should a group of 5 adults and 5 children use the group rate? Why or why not?

$$5(19) + 15(6) = 185 \quad 185 < 200$$

**No, the group rate cost \$15 more.**

Still need help with: