

6-4 Applications of Linear Systems

The state fair is a popular field trip destination. This year the freshmen class at Righetti High school and the freshmen class at St. Joseph High school both planned trips there. The freshmen class at Righetti High school rented and filled 8 vans and 8 buses with 240 students. St. Joseph High school rented and filled 4 vans and 1 bus with 54 students. Every van had the same number of students in it as did the buses. Find the number of students in each van and in each bus.

1. Define two variables for this problem.

Let v = # of students in a van
 b = # of students in a bus

(2)

2. Write two equations that describe this situation.

$$8v + 8b = 240$$

$$4v + 1b = 54$$

(2)

3. Solve the system by an algebraic method of your choice.

$$\begin{array}{r} 8v + 8b = 240 \\ -2(4v + 1b = 54) \\ \hline 8v + 8b = 240 \\ -8v - 2b = -108 \\ \hline 6b = 132 \\ \frac{6b}{6} = \frac{132}{6} \\ \boxed{b = 22} \end{array}$$

(2)

4. State your answer clearly in a sentence.

There are 8 students in each van and 22 students in each bus.

(2)

5. Check your answer in the original equations. Show your work clearly!

$$\begin{array}{l} v = 8 \\ b = 22 \end{array}$$

$$\begin{array}{l} 8v + 8b = 240 \\ 8(8) + 8(22) = 240 \\ 64 + 176 = 240 \\ 240 = 240 \checkmark \end{array}$$

$$\begin{array}{l} 4v + 1b = 54 \\ 4(8) + 1(22) = 54 \\ 32 + 22 = 54 \\ 54 = 54 \checkmark \end{array}$$

(2)