Questions on SPUR Objectives

SKILLS Objective A

In 1–4, solve the system using the linear combination method.

1. \[
\begin{align*}
3m - 2n &= 30 \\
-3m + 5n &= -39
\end{align*}
\]

2. \[
\begin{align*}
4x + 3y &= 2.6 \\
5x - 2y &= 2.1
\end{align*}
\]

3. \[
\begin{align*}
4x - y &= -8 \\
-8x + 2y &= 16
\end{align*}
\]

4. \[
\begin{align*}
3a - b + 2c &= 12 \\
3a + b + 4c &= 9 \\
a + 2b - 2c &= 13
\end{align*}
\]

PROPERTIES Objective D

5. For what value of \( k \) is the system \[
\begin{align*}
6x + ky &= 9 \\
2x - 5y &= 7
\end{align*}
\] inconsistent?

6. Suppose \( k = 10 \) in the system in Question 5. While solving the system on a CAS, suppose you have stored the first equation as eq1 and the second equation as eq2. Tell which variable would be eliminated if you entered each of these expressions.

   a. \([-1/3)eq1 + eq2 \]
   b. \(eq1 + 2eq2 \)
   c. \(eq1 + -3eq2 \)
   d. \(0.5eq1 + eq2 \)

USES Objective F

7. The Indian mathematician Mahavira made up this problem around 850 CE: “The price of nine citrons and seven fragrant wood apples is 107; again, the mixed price of seven citrons and nine fragrant wood apples is 101. Oh you arithmetician, tell me quickly the price of a citron and a wood apple here, having distinctly separated these prices well.”

8. A chemist mixes \( A \) ml of a 10% solution of acid with \( B \) ml of a 50% solution. The resulting mixture has 800 ml of a solution that is 20% acid.

   a. Write an equation relating \( A \), \( B \), and the total amount of solution.
   b. Write an equation relating the amounts of acid in the three different solutions.
   c. Solve your system to find how much of each solution was used.