Math 141 - Spring 2010 Exam 1 Answers

Form A

1. C
2. A
3. C
4. B
5. C
6. D
7. B
8. C
9. The system has infinitely many solutions. The general solution is \((.9 - 1.3t, 4 - 2t, 1.7 - .9t, t)\) where \(t\) is any real number.

\[
\begin{bmatrix}
1 & -3 & -1 & 2 \\
0 & -10 & 2 & -2 \\
0 & 12 & 7 & -3
\end{bmatrix}
\]

11. Let \(x\) = the number of cars they need, \(y\) = the number of vans they need, and \(z\) = the number of buses they need

\[
\begin{align*}
5x + 12y + 65z &= 300 \\
120x + 200y + 675z &= 3875 \\
y &= 2x
\end{align*}
\]

12. They should produce 673.5314 units of food and 592.5051 units of clothing.

\[
\begin{bmatrix}
7c + 12a & -7 + 6a \\
4b + 2c + 20 & 8 + 2b \\
4c + 24 & 8
\end{bmatrix}
\]

Form B

1. B
2. B
3. A
4. C
5. D
6. D
7. C
8. A
9. The system has infinitely many solutions. The general solution is \((4.4 - 1.3t, -1 - 2t, 0.2 - 0.9t, t)\) where \(t\) is any real number.

\[
\begin{bmatrix}
1 & -3 & 4 & -2 \\
0 & 23 & -19 & 12 \\
0 & -1 & 11 & -2
\end{bmatrix}
\]

11. Let \(x\) = the number of cars they need, \(y\) = the number of vans they need, and \(z\) = the number of buses they need

\[
\begin{align*}
6x + 10y + 70z &= 350 \\
100x + 175y + 750z &= 4800 \\
y &= 2x
\end{align*}
\]

12. They should produce 476.9614 units of food and 328.7671 units of clothing.

\[
\begin{bmatrix}
2c - 12a & -4 + 24a \\
c - 21 - 3b & 40 + 6b \\
3c + 15 & -36
\end{bmatrix}
\]