# 1.) (a) If the determinant of
\[
\begin{bmatrix}
  a & b & c \\
  d & e & f \\
  g & h & i \\
\end{bmatrix}
\]
is 5 then the determinant of
\[
\begin{bmatrix}
  a & b & c \\
  d & e & f \\
  4g & 4h & 4i \\
\end{bmatrix}
\]
is ________

(b) If the determinant of
\[
\begin{bmatrix}
  a & b & c \\
  d & e & f \\
  g & h & i \\
\end{bmatrix}
\]
is 5 then the determinant of
\[
\begin{bmatrix}
  a & b & c \\
  g & h & i \\
  d & e & f \\
\end{bmatrix}
\]
is ________

# 2.) Evaluate (one of these is easier done using cofactors)

(a.)
\[
\begin{vmatrix}
  1 & -4 & 1 \\
  2 & -6 & -1 \\
  3 & -12 & -4 \\
\end{vmatrix}
\]

(b.)
\[
\begin{vmatrix}
  6 & -1 & 2 \\
  4 & 5 & -2 \\
  0 & 3 & 0 \\
\end{vmatrix}
\]
# 3.) Without actually solving the system below, tell what kind of solution you expect it to have (i.e. unique solution, no solution, or many solutions). Explain the reason for your answer. You explanation must include reference to your answer to problem 2c above.

\[
\begin{align*}
2a + 9b & + 3f = 9 \\
b + 7d & + 8f = 7 \\
4c & + 4e = 2 \\
5d & + 6f = 4 \\
e & + 7f = 19 \\
2f & = 65
\end{align*}
\]

# 4.) In the following system of linear equations, solve for \(x_2\) only using Cramer’s Rule: (NOTE: FOR YOU TO RECEIVE ANY CREDIT, I MUST SEE THAT YOU ARE APPLYING CRAMER’S RULE.)

\[
\begin{align*}
x_1 + 2x_2 & = 1 \\
5x_1 + 2x_2 & = 13
\end{align*}
\]

# 5.) (a) Write the adjacency matrix for the following digraph:

```plaintext
Sorry guys, I left out the network here – I won’t on Friday.
```

(b) In words, how would you obtain the number of 27-paths existing from vertex 7 to vertex 6? (10)
# 6. The following matrix has \(|A| = -1\), find its inverse

using the formula \( A^{-1} = \frac{1}{|A|} \text{adj}(A) \)

\[
A = \begin{bmatrix}
1 & 2 & 4 \\
0 & 2 & 5 \\
1 & 3 & 6
\end{bmatrix}
\]

If you have time, check that your answer for \( A^{-1} \) satisfies \( AA^{-1} = I_3 \) and \( A^{-1}A = I_3 \).