1. If we halve the mesh size for this 2-dimensional problem, by what factor do we increase each dimension of the matrix?

(a) 1
(b) 2
(c) 4
(d) 8
(e) None of these are correct.
2.

For an iterative method, if the residual is small, do we know that our approximate answer is accurate? Why?

(a) Yes.
(b) No.
3.

Do one iteration of Jacobi’s method to solve the problem

\[
\begin{bmatrix}
1 & 2 \\
3 & 4 \\
\end{bmatrix}
\begin{bmatrix}
x_1 \\
x_2 \\
\end{bmatrix}
=
\begin{bmatrix}
4 \\
10 \\
\end{bmatrix},
\]

with the initial guess \( x^{(0)} = \begin{bmatrix} 1 \\ 1 \end{bmatrix} \). (One iteration means updating both entries of \( x \).)

(a) \( x^{(1)} = [1; 1] \)

(b) \( x^{(1)} = [2; 1] \)

(c) \( x^{(1)} = [2; 7/4] \)

(d) \( x^{(1)} = [2; 2] \)

(e) None of these are correct.