Exercise 11. *Multi-dimenstional Newton's method*

- *What are the 3 roots of $\vec{f}$ in the code above? (think of them as* `r1`, `r2`, `r3`.*)*
- *Implement the program above and play around with the starting point to get several different answers. If you get a warning about singular matrices, don't worry about it.*
- *Find the Jacobian matrix, $J\vec{g}$, of:* $\vec{g}(\vec{x}) = \begin{pmatrix} \sin(x_1 + 2x_2^2) - x_2 \\ x_1^2 x_2 - x_1 \end{pmatrix}$
- *The function g has many roots; modify the Newton solver to find some them by manually starting at different places.*
- *Are you iterating enough times? Check that the results you get are a good enough root, and if they are not, change the number of iterations so that they are.*

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