Student name:

You have 10 minutes to complete the quiz. Calculators are not permitted, and remember to show your calculations and explain your reasoning in order to receive full credit.

1. A goat is in a valley where the elevation as a function of position is given by $E(x, y) = x^2 - 4xy + 4y^2 - 4$. If the goat is at position $(3, 2)$ and running in the direction $\langle 1, 1 \rangle$, is it currently going uphill or downhill?