

2.4 figure it out

Last month, you noticed the price of asparagus rising, and you also noted that there was less asparagus being sold than in the prior month.

a. What inferences can you draw about the behavior of the supply and demand for asparagus?

b. Suppose that the expanded supply curve for asparagus can be expressed as $Q^S = 1,000 + 0.8P - 4P_f$, where P_f is the price of fertilizer. Show that the law of supply holds using calculus.

c. Using calculus, determine whether the quantity supplied of asparagus increases or decreases as the price of fertilizer increases.

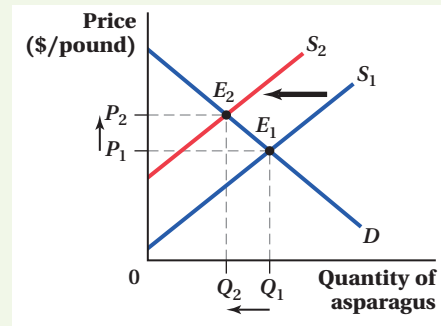
Solution:

We need to work backwards to determine what could have happened to either supply or demand to lead to the change described in this question. Let's start with the change in price. The equilibrium price of asparagus is *rising*. This must mean one of two things: Either the demand for asparagus rose or the supply of asparagus fell. (If you have trouble seeing this, draw a couple of quick figures.)

We also know that the equilibrium quantity of asparagus fell. A drop in the equilibrium quantity can only have two causes: either a decrease in the

demand for asparagus or a fall in the supply of asparagus. (Again, you may want to draw these out to see such results.)

Which shift leads to both a rise in equilibrium price and a fall in equilibrium quantity? It must be a decrease in the supply of asparagus, as shown in the figure.



b. Since $\frac{\partial Q^S}{\partial P} = 0.8 > 0$, so the law of supply holds.

c. Since $\frac{\partial Q^S}{\partial P_f} = -4 < 0$, we know that the quantity supplied of asparagus decreases as the price of fertilizer increases, which is the expected relationship given that fertilizer is an input to the production process of asparagus.