a banana problem

March 20, 2017

Question 1. *A farmer has 3000 bananas. She needs to take them to the market 1000 miles away to sell them; however, she only has the strength to carry 1000 bananas at a time. Also, she needs to eat 1 banana to have the energy to travel 1 mile. What is the maximum number of bananas she can get to the market?*

Let M be the maximum number of bananas she can get to the market.

Question 2. *How do you know your answer in Question 1 equals M? Can you prove it?*

Question 3. *Can she get M bananas to the market without leaving any bananas behind on her path?*

Question 4. *Can she get M bananas to the market and also leave bananas behind on her path?*

Question 5. *What is the minimum number of bananas she can eat while still getting M bananas to the market?*

Question 6. *What is the maximum number of bananas she can eat while still getting M bananas to the market?*

Question 7. *What if her sister, who can also carry 1000 bananas but also has to eat 1 banana to have the energy to travel 1 mile helps her? Can they get more bananas to the market? If so, how many?*