**Question 4**

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**From the question we know that the ends of the line are and respectively. We can summarize the location of the food into three cases.**

**The first one is at the left end of the line, which can be expressed as**

**.**

**Then, the total length of the ant's walk in this case would be .**

**The second one is at the right end of the line, which can be expressed as**

**.**

**Then, the total length of the ant's walk in this case would be .**

**The third one is at the middle of the line, which can be expressed as**

***.***

**Then, the total length of the ant's walk in this case would be .**

**We can substitute the numbers to calculate, for example, when we have five ants the total distance for different cases will be:**

**Case 1, .**

**Case 2, .**

**Case 3, .**

**In summary, we can clearly see that only in the third case, the ants move the shortest distance.**

**So, the value of x which minimises the total distance walked by all ants is 0 which is right in the middle of the line.**