Metro Plans

Let us assume that in four years, we are going to have a six-month period in which we will be taking trains or buses to commute. In front of us, we only have two choices: purchase a monthly MetroCard or refill the card when we need to. Let’s assume that we will be given a card for free and we can select our own purchase plan. Suppose a monthly MetroCard costs $125. In other words, you can use the card and refill it for a fee of $125, then you don’t need to worry about it for 30 days. For a regular MetroCard, you will pay per ride and refill when it is out of money. Keep in mind that you will receive a 10% bonus for every dollar you add to the card. For a single commute, we pay $2.75. From January to June, you will use your MetroCard 50, 47, 52, 55, 58, and 45 times respectively. Which plan is cheaper for each of the six months? (Hint: 10% bonus means that you don’t need to pay full $2.75 for one trip. Extra credit: why?)

Challenging question: graph these two MetroCard plans on the same set of axes and determine:

* When are the costs of both plans the same?
* When it better to have an unlimited MetroCard?
* When is it better to have a regular MetroCard?

Hint: Let x be the number of trips and y be the total cost of the rides.

<https://www.desmos.com/calculator/iggeyxzzkn>