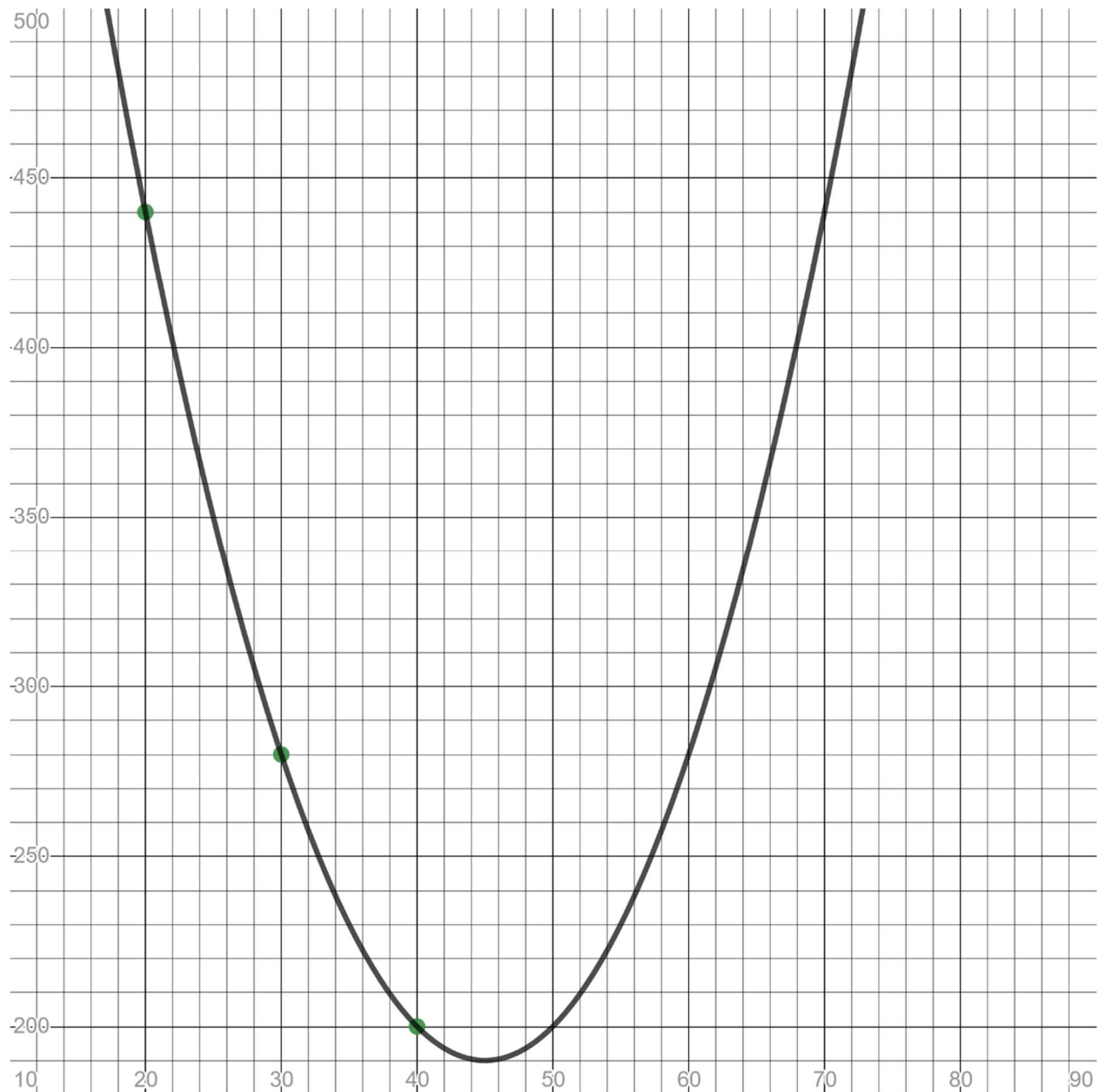


## Writing Pseudocode to Determine Car Insurance Premium

**Background:** The graph below represents age on the  $x$ -axis and accidents per 100 million kilometers driven on the  $y$ -axis. For example, an average 20-year-old driver would expect to be involved in 440 accidents if they drove 100 million kilometers.



You may be noting that no 20-year-old could possibly drive 100 million kilometers in a year. So why are these numbers so big? If you sample a very small number of drivers at age 20, you run the risk of that sample not resembling the rest of the pool of drivers age 20. One of the big advantages of using computers is that they can easily handle large databases that a human being would find daunting.

**Activity:** Let's see if we can write some pseudocode for determining a yearly premium. Assume that the actuaries have already done some of the groundwork for you. They determined that the safest drivers on the road should pay \$1000 per year and that 16-year-old and 74-year-old drivers should pay twice that amount. Write pseudocode that will input age and output the corresponding yearly premium for that input. Please don't spend a lot of time being mathematically precise. It will suffice to use a single dollar amount added on to the lowest premium for each year above (or below as the graph is symmetric) age 45.

**Discussion:**

- 1) This is a data-driven, computer analyzed approach to setting a price for car insurance. As such, we may think that we have removed the potential bias and prejudice that a human being doing this work might unknowingly bring to the job (if you are not familiar with implicit bias, read about during this vacation period!). Do you see any unfairness with this approach or potential for problems? If not, can you briefly justify why you feel this is a reasonable approach?
  
- 2) Are there ways that we could improve this model? What other information might you seek about an individual applying for driver insurance? Your group should agree on two additional pieces of data that you'll collect on each applicant. For each of these pieces of data, identify potential problems or unfairness or argue that using said data is a reasonable way to determine the price of car insurance.

