You have been hired as part of a market research team to analyze the potential of eSneakz, a new luxury tennis shoe/boom box poised to take the country by storm.

Preliminary research indicates that if eSneakz sell for $p$ dollars each, a total of $q$ thousand pairs will sell. The price $p$ and quantity $q$ are related by the demand function

$$p = D(q) = 2250 - 10q^2.$$ 

Your four-member team needs to calculate the total available revenue — the amount of sales money eSneakz would make if every consumer bought the shoes for the maximum price they were willing to pay. This amount is equal to the integral, measured in thousands of dollars:

$$\int_0^{15} D(q)\,dq.$$ 

**Problem 1.** (10 points) As the only member of the team who’s proficient in calculus, you decide to compute the integral’s exact value. What is it? Include units in your answer.

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**Problem 2.** (7 points) Jeff doesn’t know calculus, but he decides to approximate this integral with a right-hand sum using 5 subintervals. On the graph provided, sketch what this right-hand sum looks like. Will it be an overestimate or an underestimate of the exact value? Why?
Problem 3. (9 points) Mandy doesn’t know calculus, but she is good at adding numbers. She decides to find the exact numerical value of Jeff’s right-hand sum. What is it?

Be precise — do not merely estimate from the graph.

Problem 4. (4 points) Simon doesn’t know calculus, but wants to look smart. How could he write Mandy’s right-hand sum using summation notation?