

Math 108
 Fall 2018
 Dr. Lily Yen

Test 3

Show all your work

Name: _____
 Number: _____
 Signature: _____
 Score: ____/40

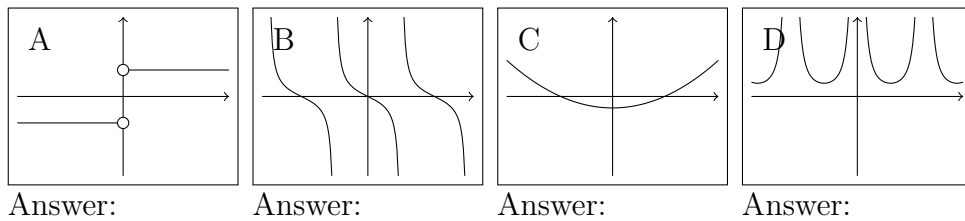
No Calculator allowed in this part.

Problem 1: Find dy/dx for $x + \sqrt{x}\sqrt{y} = y^2$.

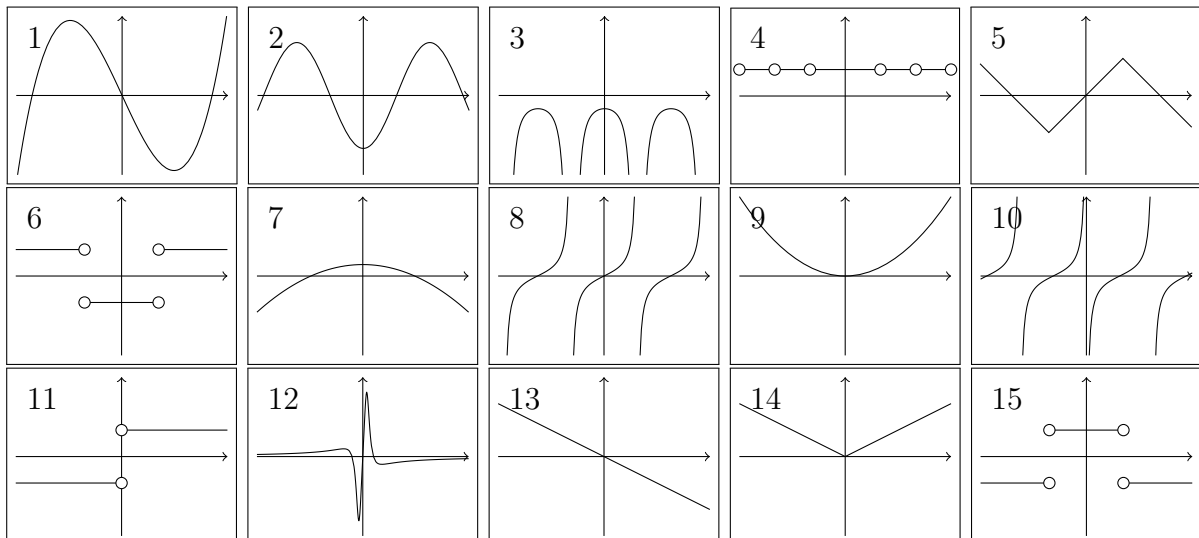
At the point $(2, 2)$, find the equation of the tangent line to the given curve defined implicitly in this problem.

Score: ____/5

Problem 2: Match each graph of $y = f'(x)$ (A–D) with the graph of a possible $y = f(x)$ (1–15).



Possible graphs, $y = f(x)$ below whose derivative graphs are A, B, C, D above:



Score: ____/4

Test 3

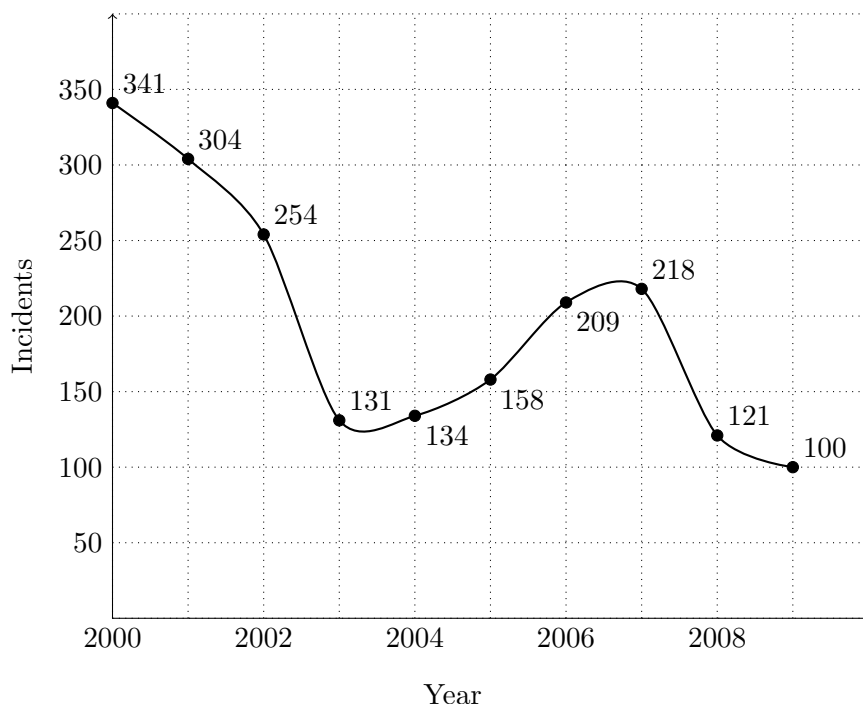
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Calculators allowed for this part.

Problem 3: The number of bank burglaries (entry into or theft from a bank during non-business hours) in the US for the years 2000 to 2009 is given in the graph below where the dots represent actual data.



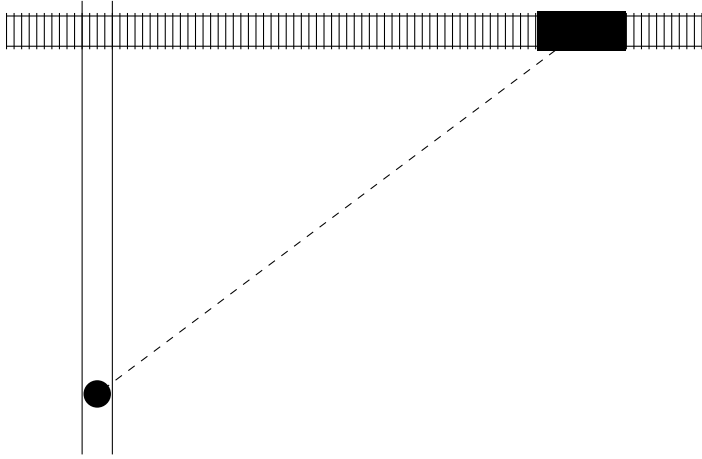
- How many bank burglaries are predicted by the model in 2010?
- Find the average number of bank burglaries per year from 2000 to and including 2005.
- According to the model, when does the instantaneous rate of change of bank burglaries equal to the average rate of change between 2000 and 2005? Show your work on the graph.

Score: /5

Problem 4: Use linear approximation to estimate $\sqrt[3]{7.9}$ to 4 decimal places. Clearly state your function, then show the formula of linear approximation and identify all parts defined in your formula.

Score: /4

Problem 7: Bobby is biking north at 8 m/s, heading for a railway crossing. A train is on the rails, moving west at 10 m/s. When Bobby is 12 m from the crossing, and the train is 16 m from the crossing, at what speed is the distance between Bobby and the train decreasing?



Score: /6

Problem 8: Let the model

$$A(x) = 0.003631x^3 - 0.03746x^2 + 0.1012x + 0.009$$

approximate blood alcohol concentration in a 170 lb woman x hours after drinking 2 oz of alcohol on an empty stomach, for x in the interval $[0, 5]$. Use linear approximation to approximate the change in alcohol level from 1 to 1.2 hours.

Score: /4