

$$f(x) = -2x^3 + 5x^2$$

Use this function to answer the questions on this page.

- Determine the slope of the secant line from $x = 3$ to $x = 4$

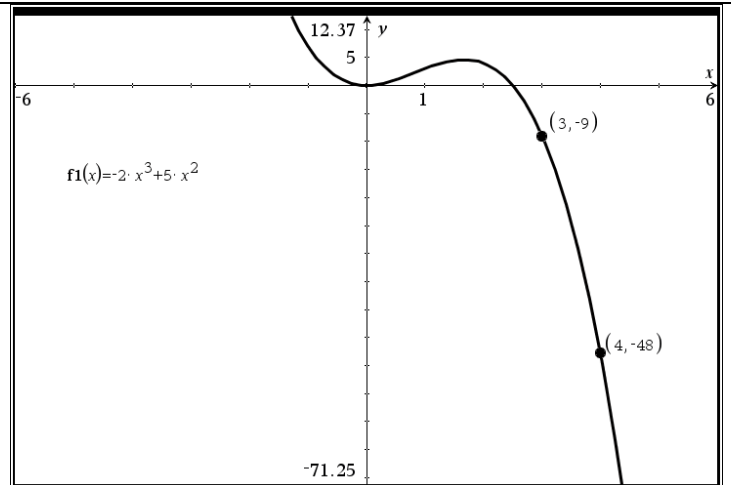
SHOW DIFFERENCE QUOTIENT

- Write the equation of the secant line from $x = 3$ to $x = 4$

(CALCULUS DOES NOT USUALLY CARE ABOUT Y INTERCEPT, so use modified point slope format)

- Determine the average rate of change (AROC) from $x = 3$ to $x = 4$

SHOW DIFFERENCE QUOTIENT



- Use $x = 3.9999$ and $x = 4$ to APPROXIMATE the instantaneous rate of at $x = 4$

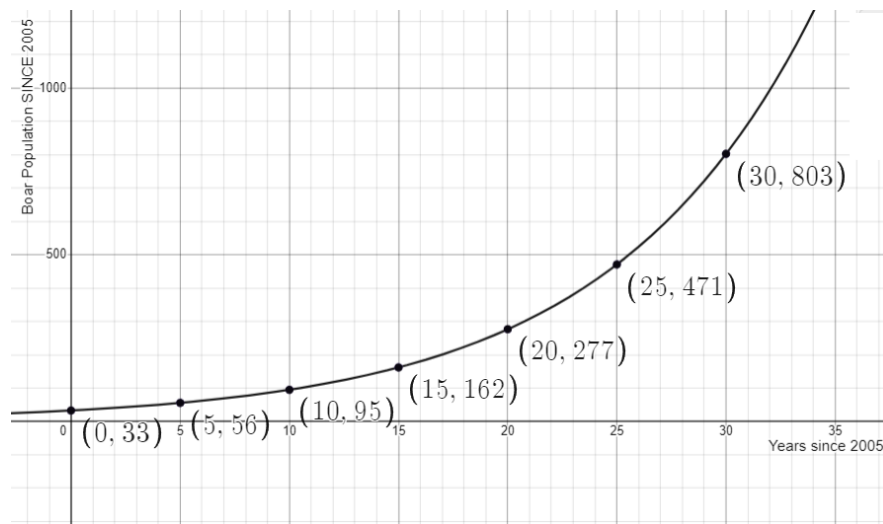
SHOW DIFFERENCE QUOTIENT

- Use $x = 4.0001$ and $x = 4$ to APPROXIMATE the instantaneous rate of at $x = 4$

SHOW DIFFERENCE QUOTIENT

- What did #4 and #5 suggest as the APPROXIMATE slope of the tangent line?

- Write the equation of APPROXIMATE tangent line at $x = 4$



Use this graph and the given information below to answer the questions below.

The population of a community of wild boar is modeled by the function b , where $b(x)$ gives the number of boar and x gives the number of years since 2005 for $0 \leq x \leq 30$ years

8. Sketch the tangent line at $x = 20$ years after 2005. DO THIS ON THE GRAPH ITSELF!
9. Using the given graph and the related points, give a rough estimate of the instantaneous rate of change at $x = 20$ years. Give a related difference quotient based on this rough estimate.
10. Give a related difference quotient of a better approximation for $b(x)$ IF YOU KNEW the function for $b(x)$!
11. Suppose that you knew that this $f(x)$ was, in fact, $b(x) = 32.8245(1.11245)^x$ with x measured in years and $b(x)$ measured in meters. Give a better estimate of the instantaneous rate of change at $x = 20$ years. Give a related difference quotient based on this rough estimate.

The number of jobs lost in the U.S. for the 2020 economy can be modeled by J , where $J(m)$ is the number of lost jobs and m is the month in 2020 for $0 \leq m \leq 12$

12. What does $J(7)$ represent? (hint: a specific month should be mentioned in the best explanation)
13. What does $\frac{J(9)-J(3)}{9-3}$ represent? Be specific and use units!
14. What does $\frac{J(10)-J(9.9999)}{10-9.9999}$ represent? Be specific and use units!

EC: If you could improve one thing about yourself, what would it be and why?