

$$f(x) = 2x^2 - 4x$$

Use this function to answer the questions on this page.

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

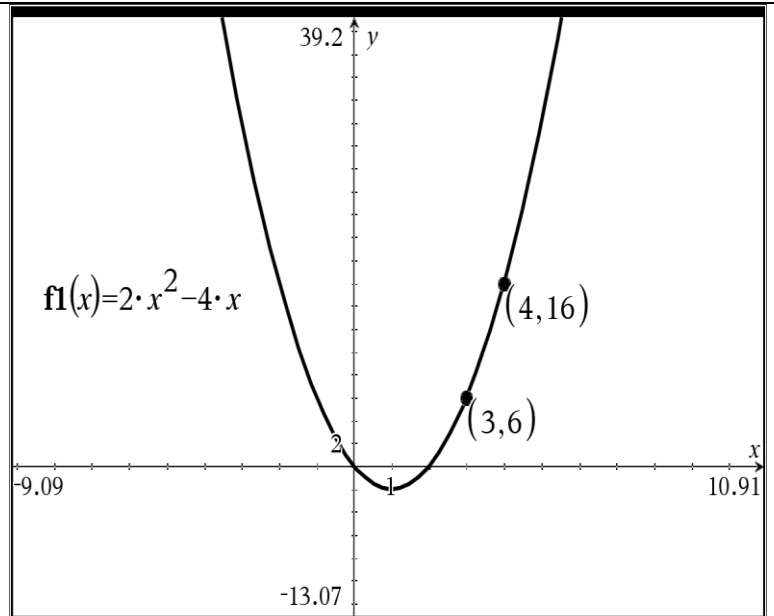
SHOW DIFFERENCE QUOTIENT

- 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 $x = 4$

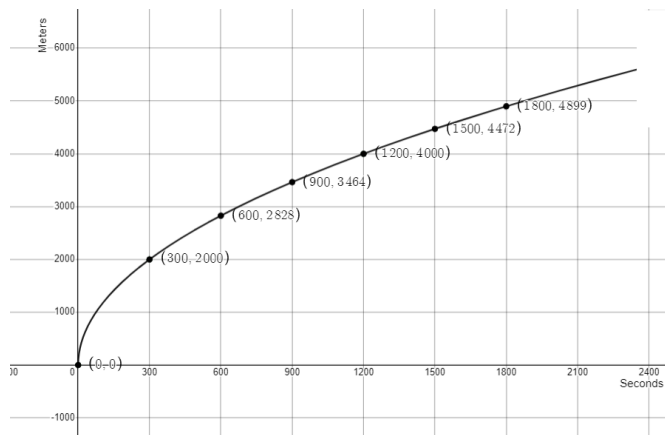
SHOW DIFFERENCE QUOTIENT

- 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.

A jogger's distance whole on a run can be modeled by the function depicted on the given graph. $f(x)$ gives the distance the jogger has ran in meters and x gives the number of seconds the jogger has been running for $0 \leq x \leq 1800$ seconds

8. Sketch the tangent line at $x = 600$ seconds. DO THIS ON GRAPH ITSELF!

9. Using the given graph and the related points give a rough estimate of the instantaneous rate of change at $x = 600$ seconds. Give a related difference quotient based on this rough estimate.

10. Give a related difference quotient of a better approximation for $f(x)$ IF YOU KNEW the function for $f(x)$!

11. Suppose that you knew that this $f(x)$ was, in fact, $f(x) = 115.47\sqrt{x}$ with x measured in seconds and $f(x)$ measured in meters. Give a better estimate of the instantaneous rate of change at $x = 600$ seconds. Give a related difference quotient based on this rough estimate.

The number of graduating seniors at a high schools can be modeled by G , where $G(t)$ is the number of graduating seniors and t is the year since 2005 for $0 \leq t \leq 25$

12. What does $G(6)$ represent? (hint: a 4 digit year should be mentioned in the best explanation)

13. What does $\frac{G(6)-G(1)}{6-1}$ represent? Be specific!

14. What does $\frac{G(6)-G(5.9999)}{6-5.9999}$ represent? Be specific!

$$f(x) = 2x^2 - 4x$$

How do I get the difference quotient on TI Nspire?



Difference quotient

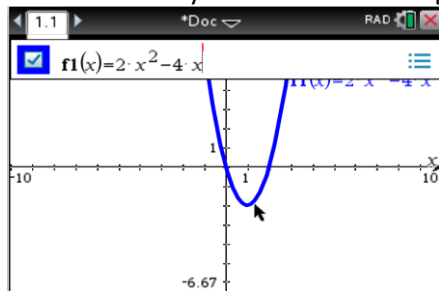
Note: this is the difference quotient $\frac{f(x_2)-f(x_1)}{x_2-x_1}$

In previous classes, we called this SLOPE, in upper-level classes leading to CALCULUS, we use the fancier term, but it is all still about SLOPE or Rate of Change.

On the TI Nspire, it should be $\frac{f_1(x_2)-f_1(x_1)}{x_2-x_1}$

Option 1:

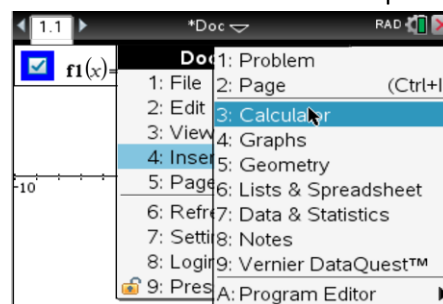
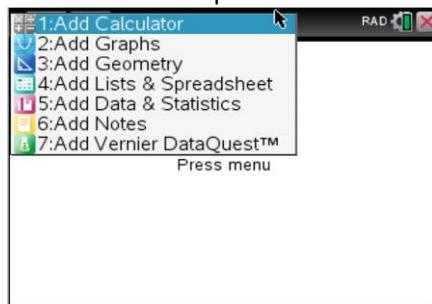
1. Define your function on Graphs page.



2. Add a calculator page (Press CTRL i, or press DOC button and INSERT PAGE)

This is CTRL i path or CTRL DOC Button path

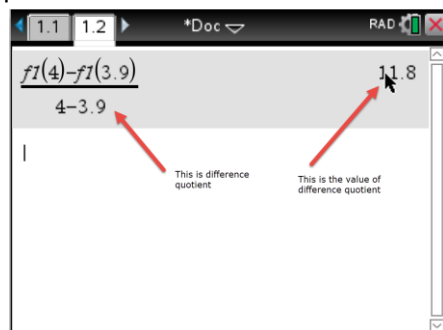
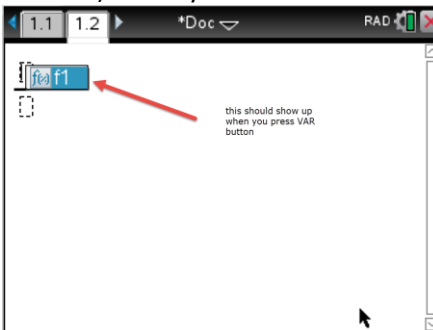
This is DOC Button path



3. Press CTRL / button to insert a fraction



4. Press VAR button (faster method) or type f1() using keystrokes (slower method) directly to create difference quotient



How do I get the difference quotient on TI Nspire?



Difference quotient

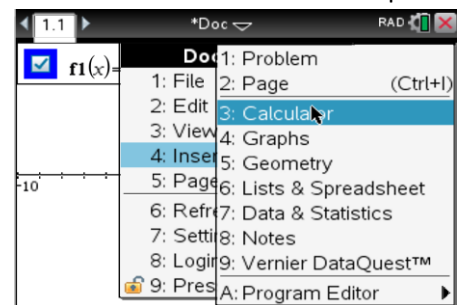
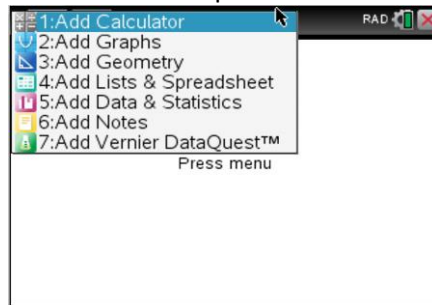
Note: this is the difference quotient $\frac{f(x_2)-f(x_1)}{x_2-x_1}$

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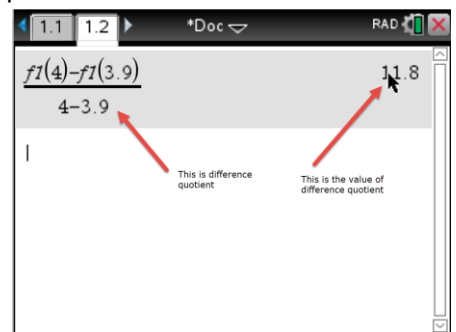
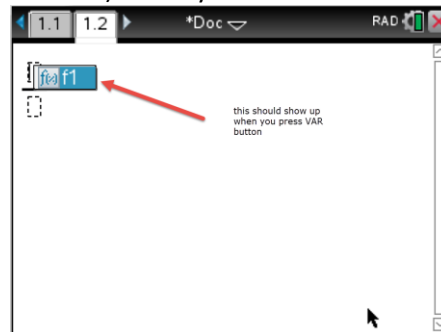
On the TI Nspire, it should be $\frac{f_1(x_2)-f_1(x_1)}{x_2-x_1}$

Option 2:

1. Add a calculator page (Press CTRL i, or press DOC button and INSERT PAGE)
This is CTRL i path or CTRL DOC Button path This is DOC Button path



2. Define your function using := button (this is CTRL and the button immediately to the RIGHT of the 9 button (you know it worked if it says DONE))
3. Press CTRL / button to insert a fraction.
4. Press VAR button (faster method) or type f1() using keystrokes (slower method) directly to create difference quotient



1.1 *Doc RAD

$f1(x) := 2 \cdot x^2 - 4 \cdot x$ Done

$\frac{f1(4) - f1(3.9)}{4 - 3.9}$ 11.8

:= button is found using CTRL and button to the right of 9