Sample Quiz Difference Quotient and ROC Hour\_\_\_\_\_

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

- $fl(x)=2 \cdot x^2 4 \cdot x$  (4,16) (3,6) (3,6) (3,6) (10.91) (10.91)
  - 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
- 6. What did #4 and #5 suggest as the APPROXIMATE slope of the tangent line?
- 7. Write the equation of APPROXIMATE tangent line at x = 4

Name



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  $0 \le x \le 1800$  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  $0 \le t \le 25$ 

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!



How do I get the difference Difference quotient Note: this is the difference quotient  $\frac{f(x_2)-f(x_1)}{x_1}$ quotient on TI Nspire?  $x_2 - x_1$ In previous classes, we called this SLOPE, in upper-level classes leading to TI-*nspire* CX CAS CALCULUS, we use the fancier term, but it is all still about SLOPE or Rate of Change. TI-SmartView™ Emulator will be abled when you switch to Handheld On the TI Nspire, it should be  $\frac{f_1(x_2)-f_1(x_1)}{x_1}$ Preview.  $x_2 - x_1$ 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 RAD 🚺 🔀 RAD 🚺 🗙 \*Doc ▽ ◀ 1.1 esc ഹിon 2:Add Graphs Doc 1: Problem 3:Add Geometry 🗹 f1(x)= IB doc -4:Add Lists & Spreadsheet 1: File 2: Page (Ctrl+I) 2: Edit 3: Calculator 105:Add Data & Statistics tab 6:Add Notes 3: View4: Graphs 7:Add Vernier DataQuest™ 4: Insel 5: Geometry Press menu var 5: Page6: Lists & Spreadsheet -10 8 9 7 6: Refre7: Data & Statistics 7: Setti 8: Notes 4 5 6 8: Logir9: Vernier DataQuest™ 3 2 1 🔓 9: Pres A: Program Editor 0 (-) D E F G ?! Þ 2. Define your function using := button (this is CTRL and the button π, K L M N P J immediately to the RIGHT of the 9 button (you know it worked if it says Q R S T U 🚽 , 0 P X Y Z W DONE) 3. Press CTRL / button to insert a fraction. TI-*nspire* CX CAS 4. Press VAR button (faster method) or type f1() using keystrokes (slower TI-SmartView™ Emulator will be method) directly to create difference quotient enabled when you switch to Handheld Preview < 1.1 1.2 ▶ \*Doc 🗢 RAD 🚺 🗙 < 1.1 1.2 ▶ \*Doc 🗢 RAD 🚺 🗙 f1(4)–f1(3.9) 11.8 0 4-3.9 this should show up when you press VAR button This is difference This is the value of difference quotient esc ഹിon 2 doc • tab k 9 7 8 4 6 5 1 2 3 0 . (-) BCDEF EE A G ?!⊁ 4  $\pi$ IJKLMN H 4 **,** PQRSTU 0 V W X Y Z 🖵 Texas Instruments

