

1. True or false: $f'(x) = g'(x) \rightarrow f(x) = g(x)$? Give an explanation or a counter example.

2. Let $f(x) = 3x^2$

a) Find $f'(4)$ by making a table with increments of .001 and finding the slope

b) Find $f'(4)$ by using the limit definition.

c) Find $f'(4)$ by using `nderiv` in your calculator.

3. A mathematician takes a walk. Her position (in miles) is given by the equation $s(t) = t - t^4$, where t is time in hours. Graph this equation (*use window: $0 \leq x \leq 1, 0 \leq y \leq 1$*).

a) When does she begin to walk back home? (in minutes, please)

b) How far is she when she turns around?

c) When does she return home from her walk? (also in minutes)

d) When is she walking most quickly (minutes)

4. Use `nderiv` to find the derivative of $f(x) = |x|$ when $x = 0$. Do you agree with the calculator's answer? (no) What went wrong? What do you think the calculator is doing?

5. Use the limit definition of derivative to find the following:

a) $f'(2)$, for $f(x) = 1/x$

b) $g'(-1)$, for $g(x) = x^2 - 1$

c) $h'(2)$, for $h(x) = x^3$

d) Verify these results using either dy/dx in the `calc` menu or `nderiv`

6. Sketch $f(x) = \sin(x)$.

a) Make a sketch of $f'(x)$. Hypothesis?

b) Test your hypothesis using `n(deriv)` on selected values.