

# Derivatives<sup>1</sup>

1. Try the following commands:

- (a) `syms x`
- (b) `f = x^2`
- (c) `f1 = diff(f)`
- (d) `X = -3:.05:3;` .....Makes X into an array with entries from -3 to 3
- (e) `F = subs(f, X);`
- (f) `F1 = subs(f1, X);`
- (g) `plot(X, F, 'b', X, F1, 'r')`
- (h) Explain exactly what happened.

2. Repeat the above procedure for the function

$$g(x) = \frac{x^5 + x^3 + 2}{8x + 1} \quad (\text{Input as: } g = (x^5 + x^3 + 2) / (8*x + 1)).$$

3. Use the command `ezplot(g1, [0 3])` and then change the interval until you can accurately guess a solution of  $g'(x) = 0$ . Then try:

- (a) Enter `solve(g1)` and describe the results. Which part of the output is relevant? Did the computer find this output symbolically or numerically?
- (b) What is the percentage error of your guess.

4. Prepare a brief (< 1 page) written report answering all the questions. Use complete sentences and standard mathematical notation. Do **not** get a printout.

The user must consider the derivative as a function, and they must consider issues of scale in plotting functions with asymptotes.

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