

## Topic #11 (Math 31)

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1. Goals (3.8):
  - a. Implicit differentiation
2. Implicitly defined function
  - a. Simple examples.
  - b. When there are multiple function options – example: circle.
  - c. Circle: Find two implicit functions that cover all cases, then find derivatives.
  - d. But what to do if you cannot find implicit functions?? (Use implicit differentiation!)
3. Implicit differentiation
  - a. Example continued: Circle: Derivative should depend on x and y value
  - b. The method:
    - i. Differentiate the expression implicitly (i.e. multiply by  $y'$  whenever a y expression is differentiated).
    - ii. Solve for  $y'$
  - c. Apply to circle
    - i. Circle: Points where tangent line horizontal?
  - d. Problems:
    - i. 3.8: From 300 to 309
    - ii. 3.8: 317, 318, 325, 326, 327
  - e. Some reason for this:
    - i. Treat “y” as a function. Do examples, starting with “ $y(x)$ ” as inside function.
    - ii. Combine expressions with x and y and find derivative.