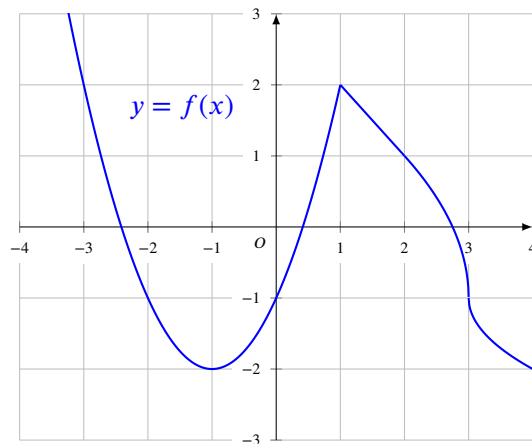


TRIG DERIVATIVES & IMPLICIT DIFFERENTIATION

October 29th, 2018

Derivative from a graph

Below is the graph of a function f .
Sketch the graph of its derivative f' .



For next lecture

For Wednesday (Oct 31), watch the videos:

- Derivatives of exponentials and logarithms: 3.13, (3.14), 3.15, 3.16, 3.17, 3.18
- Related rates: 3.19, 3.20, 3.21

Derivative of cos

Let $g(x) = \cos(x)$.

Obtain and prove a formula for its derivative directly from the definition of derivative as a limit.

Derivatives of the other trig functions

Using all the basic differentiation rules, as well as

$$\sin'(x) = \cos(x), \quad \cos'(x) = -\sin(x),$$

quickly obtain and prove formulas for the derivatives of

- ① \tan ② \cot ③ \sec ④ \csc

Implicit differentiation

The equation $\sin(x + y) + xy^2 = 0$ defines a function $y = h(x)$ near $(0, 0)$. Using implicit differentiation, compute

- ① $h(0)$ ② $h'(0)$ ③ $h''(0)$ ④ $h'''(0)$

