3.2 Differentiability

Objectives:

- I can determine if a function is differentiable

Given $f(x) = \dfrac{1}{2}x^2$ find the slope of the secant line of $f(x)$ over [1,5]

Find the average rate of change of f(x) over [2,4]
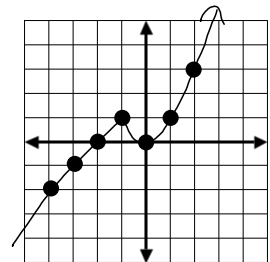
Find the average rate of change of f(x) over [2.5,3.5]

Choose an interval from the last slide that gives the best approximation of f'(3). Explain why your method gives an accurate approximation

Could you use this process to find f'(x)? Why or why not?

Find f'(3)

Differentiability

$$f(x) = \begin{cases} x+2 & if \ x < -1 \\ x^2 & if \ -1 \le x \le 1 \\ 2x-1 & if \ x > 1 \end{cases}$$

The graph of f(x) is given. What do you observe at x= -1 and x=0?

Definitions

f(x) is differentiable at x if f'(x) exists

f(x) is a differentiable function if f'(x) exists for all x in the domain

In what cases would a function not be differentiable at a point x=a?

Exploring differentiability with local linearity

Compare $f(x)=\sqrt{x^2+.001}+.99$ and $g(x)=|x|+1$ in your calculator.

How do differentiability and continuity relate to each other?

IVT for Derivatives