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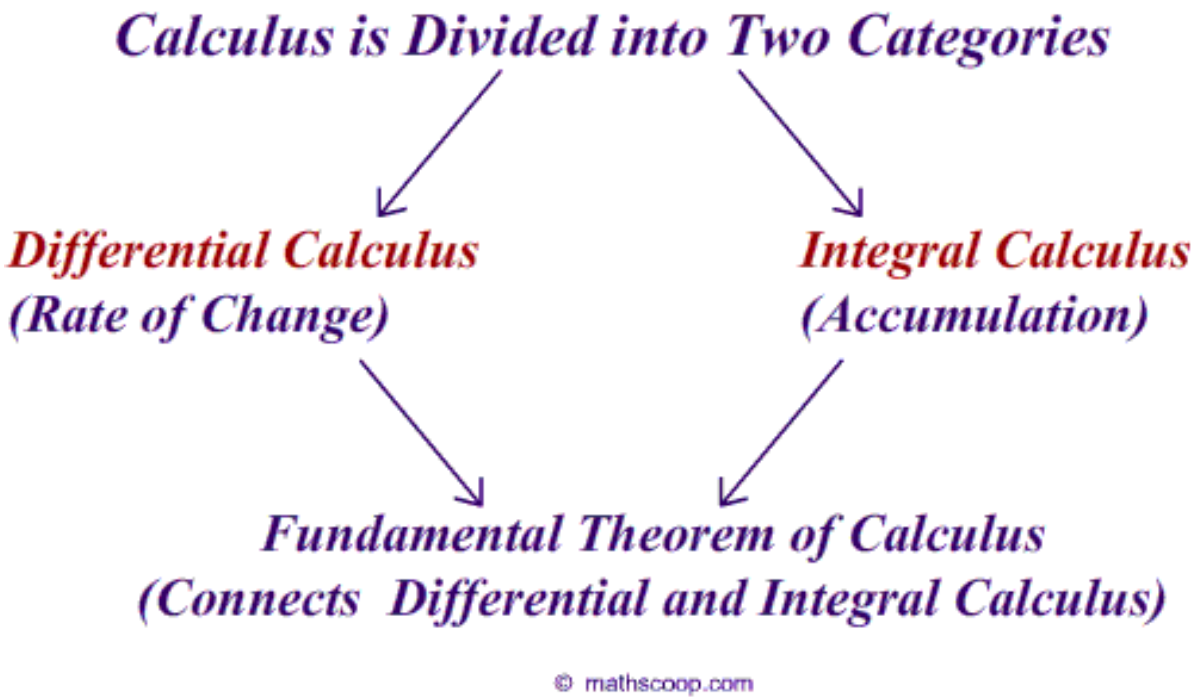
- instantaneous change is a lot simpler than changes over finite intervals of time
- so useful
  - finance: portfolio optimization
  - chemistry: rate of reaction
  - physics: mechanics
  - cs and engineering: machine learning (ex: proportional integral derivative controller)
  - geology: radioactive age equation, heat flow

Calc I Topics and Methods Will be Helpful in Calc II!

- pattern recognition
- algorithmic thinking
- local to global



Review of Trigonometry and Chapter 3 Derivatives

$$\int_0^{Ice} 3x^2 dx$$

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$$\frac{d}{dx}(tan(x)) = sec^2(x)$$

Composition of functions: $\frac{d}{dx} f(g(x)) = f'(g(x)) \cdot g'(x)$

Review of Chapter 5 and 6 Integration

- 5.2: Area under curve
- 5.3: FTC
- 5.4: Average value of $f = \dfrac{1}{b-a}\displaystyle\int_a^b f(x)dx$
- 6.2: Antiderivatives
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  $\displaystyle\int x^n = \frac{x^{n+1}}{n+1} + c$