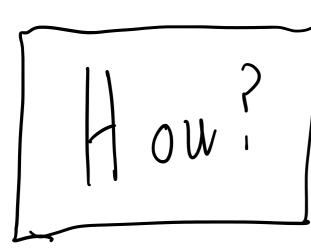- Not all integrals are "expressable"

    - e^{x^2}

    - chaotic differential equation integrals

- This does not mean that they don't exist

    - car can have velocity e^{x^2}, and
      we can find its position at some
      time.

$$\boxed{How?}$$

- Let's think of some ways to
  approximate. → We learned some in this
        class.
            - ask
- Euler
- Taylor polynomials

- We'll tie both together

give me the taylor series

$$Taylor$$

$$f(x) = f(a) + \frac{f'(a)(x-a)}{1} + \frac{f''(a)(x-a)^2}{2!} + \frac{f'''(a)(x-a)^3}{3!} + \dots$$

- define error
  If we truncate taylor series, error bounds help us understand how good
        our approximations are

    - don't need to have an actual value

- give me ways to
  estimate error
    - Alternating series bound
    - Lagrange error bound

$$\boxed{Euler}$$

give me Euler's method for one step

Runge Kutta