MAT137 - Calculus with proofs

- Assignment 10 due on April 8
- Test 5 opens on April 22

- Today: Applications
- Friday: More applications
  - **Watch video 14.11, 14.13**
  - Supplementary video: 14.15

- Please fill out course evaluations

Last time you proved that, for $|x| < 1$:

$$\arctan x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{2n+1}$$

3. Compute $\quad A = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)\, 3^n}$

I want to calculate

$$B = \int_0^1 t^{10} \sin t \, dt.$$

There are two ways to do it. Choose your favourite one:

1. Use integration by parts 10 times.
2. Use power series.

Estimate B with an error smaller than 0.001.

Add these series

1. $\displaystyle\sum_{n=2}^{\infty} \frac{(-2)^n}{(2n+1)!}$

   Hint: Think of sin

2. $\displaystyle\sum_{n=0}^{\infty} (4n+1)\, x^{4n+2}$

   Hint: $\dfrac{d}{dx}\left[x^{4n+1}\right] =$???

3. $\displaystyle\sum_{n=0}^{\infty} \frac{1}{(2n+1)!}$

   Hint: Write first few terms. Use e^1 and e^{-1}

4. $\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n\, x^{2n}}{(2n)!\,(n+1)}$

   Hint: Integrate