Introductory lecture

History and Applications of Calculus

http://pages.uoregon.edu/brundan/HAC

Second course in calculus. Ten week course. LaTeX.

Topics (1) Review of differentiation, differential equations, integration & FTC
- differentiation ← lots of trig.
- differential equations ← laws of motion
- integration ← areas & volumes
- FTC ← connects integration & differentiation

(2) Conic sections in Cartesian & polar coordinates

(3) Parametric equations, cycloids and cardioids

(4) Kepler's laws of planetary motion & Newton's proof.

(5) More trigonometry, Pythagorean triples

(6) Hyperbolic functions & the catenary

(7) Taylor series, rigorous mathematical definition of classical functions $e^{i\pi} = -1$

(8) Polynomials, cubics, complex numbers, FTA, complex power series & Euler's identity

(9) Bernoulli's brachistochrone, Bernoulli numbers

(10) Euler's formula for $\sum_{n=1}^{\infty} \frac{1}{n^2}$

LaTeX ← Overleaf

Typeset your homeworks!