

# Midterm Summary and Outlook

## MA161/MA1161: Semester 1 Calculus.

Prof. Götz Pfeiffer

School of Mathematics, Statistics and Applied Mathematics  
NUI Galway

November 09, 2020



# Summary: The Story So Far.

- **Week 1: Introduction; Numbers, Inequalities**

... where we recall basic concepts which form part of the language of calculus.

**Videos:** numbers, sets, intervals, inequalities.

- **Week 2: Functions**

... where we explore different ways to represent a function and its properties.

**Videos:** functions, piecewise, even odd.

- **Week 3: A Visit to the Function Zoo**

... where we compile a catalog of useful functions and their graphs.

**Videos:** linear, polynomial, power, trigonometric.

- **Week 4: Composition and Logarithms**

... where we use arithmetic and composition to make new functions from old.

**Videos:** yoga, composition, exponential, logarithm.

- **Week 5: Limits and Limit Laws**

... where we introduce limits and laws that help with calculating them.

**Videos:** limits, limit laws.

- **Week 6: Continuity; Horizontal Asymptotes**

... where we study the important concepts of continuity and limits at infinity.

**Videos:** continuity, intermediate, infinity, rational.

# Outlook: Differential Calculus.

- **Week 7: The Derivative**

... where we introduce the derivative as a limit that expresses a rate of change.

Videos: **derivative**, **change**, ...

- **Week 8: Differentiation Methods**

... where we list a number of rules that make finding derivatives much easier.

Videos: ...

- **Week 9: Differentiation Techniques**

... where we explore further ways of computing derivatives.

Videos: ...

- **Week 10: Optimization**

... where we apply differentiation to solving a number of optimization tasks.

Videos: ...

- **Week 11: Graph Sketching**

... where we see how effects of derivatives on graphs are used to sketch them.

Videos: ...

- **Week 12: Exponential Growth and Decay**

... where we apply differentiation to develop models for exponential behaviour.

Videos: ...