## Desmos & GeoGebra Fall 2025

## Free, online mathematical and computational websites

- Desmos
- GeoGebra
- WolframAlpha
- **Desmos activities** 
  - <u>v acl B</u>
  - <u>y acl B interval</u>
  - 2 acl A
  - 2 acl B
  - Plot a sequence of real numbers
  - Cauchy sequence
  - <u>Continuity (Desmos)</u>
  - Floor discontinuity
  - <u>Delta Tester continuity</u>
  - Delta Tester lines
  - Continuity of reciprocal
  - Finding c to make continuous
  - $\sin(1/x)$  vs  $x^2\sin(1/x)$
  - Extreme values
  - Derivative and difference quotient
  - Function and its derivative
  - <u>sinx and its derivative</u>

- Octave Online
- Symbolab
- e^x vs ln^x and derivatives
- Antiderivative of x/2
- Area between curves
- Riemann sums left endpoint
- Riemann sums left/right/midpoint
- Function and its integral
- Pointwise convergence of monomials
- Pointwise convergence
- Sequence of powers of sine
- Uniform convergence
- Pointwise but not integral convergence
- Pointwise with continuous, but not integral convergence
- Bernstein polynomial
- Weierstrass Approximation Theorem

# GeoGebra by Juan Carlos Ponce Campuzano (JCPC)

- Complex Analysis: A visual and interactive introduction
- <u>ICPC's homepage on GeoGebra</u> tons of great activities!

#### GeoGebra activities

- Spiral and arbitrarily close
- <u>Divergent sequence, two-point Slim</u>
- <u>Divergent sequence, plot and graph</u>
- Limit of a sequence
- Convergent sequence, plot and graph
- <u>Divergent sequence, complex</u>
- <u>Topologist's sine curve (connected,</u> not path connected)
- Images of neighborhoods, f
- Images of neighborhoods, q
- Images of neighborhoods, h
- Continuity and preserving closeness
- <u>Discontinuity and not preserving</u> closeness
- Discontinuous and unbounded
- Continuity and limit at 0 (squeezed Topologist's...)

- <u>Topologist's sine curve</u>
- <u>Continuity</u> (GeoGebra)
- Continuous but not differentiable
- Continuity with a 2x2 matrix
- Slopes of secant and tangent lines
- Rolle's Theorem and Mean Value Theorem
- Copy of upper and lower Riemann sums
- <u>Uniform convergence 2</u>
- Taylor Approximation
- <u>Taylor Polynomial Approximation of</u> Functions
- Riemann-Integral versus Lebesgue-Integral

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## **Other Desmos activities**

- The set of positive integers has measure 0
- Convergence in L^1 but not L^infinity
- <u>Cauchy sequence of functions in sup/max metric</u>
- Approximation by simple functions
- Someone's awesome Mandelbrot set

## **Old Desmos activities**

- Pointwise convergence of monomials
- Sequence of powers of sine
- <u>Uniform convergence</u>
- Pointwise convergence
- Pointwise vs uniform convergence
- Pointwise but not uniform convergence:  $g_n(x) = x^n$  on [0,1]
- Pointwise convergence 2: f\_n(x) = (x^2+nx)/x
- <u>Uniform convergence 2</u>:
- $g_n(x) = 1/(n(1+x^2))$
- Pointwise vs uniform convergence 2:  $f_n(x) = (\sin x)^n$  on [-2pi,2pi]
- Pointwise but not integral convergence:  $f_n(x) = n$  on (0,1/n),  $f_n(x) = 0$  on  $\{0\}U[1/n,n]$
- Pointwise with continuous seq., but unbounded limit