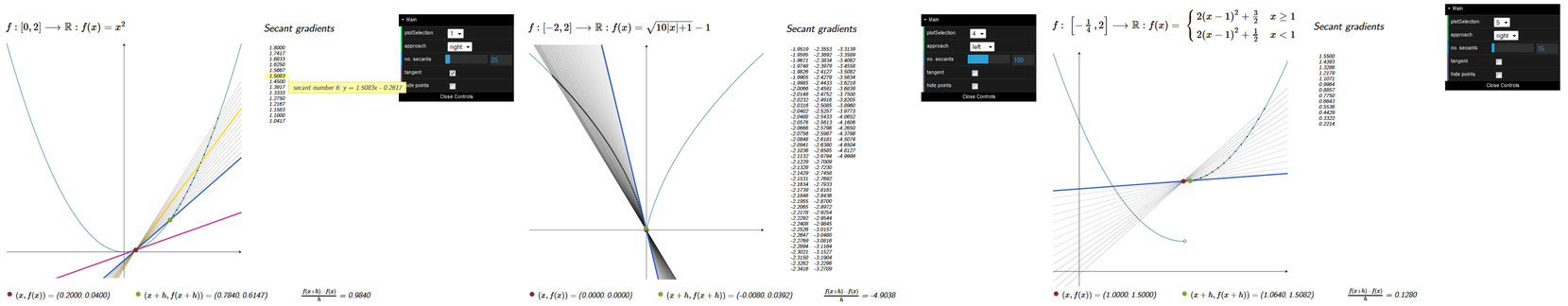
Developing interactive mathematical and statistical visualisations

Mathematics Education Support Hub*

University of Western Sydney

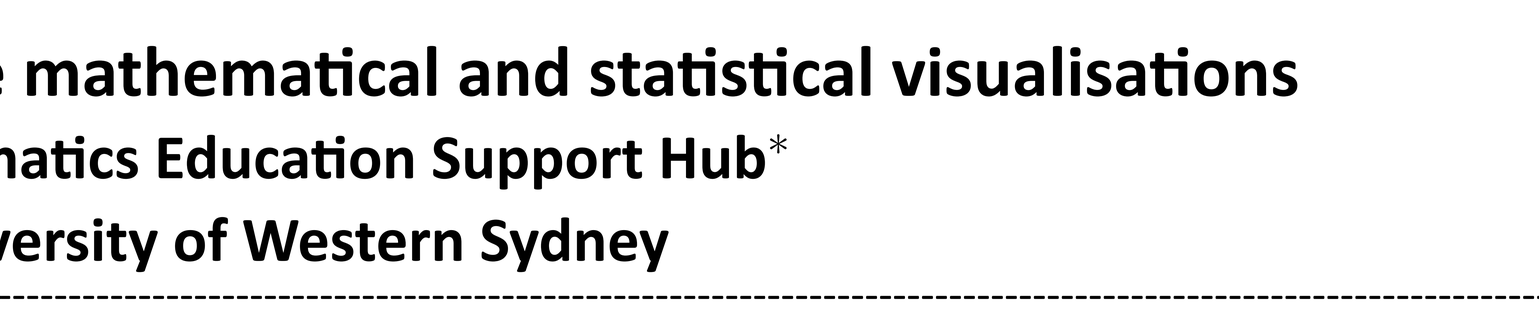
Secants 'limiting' to tangents



What: An interactive online application that enables exploration of the first-principles definition of the derivative.

How: A dynamic point on the curve is moved to generate a sequence of secant gradients which is seen to converge (or not) to a limit. This is key idea underlying the concept of the derivative.

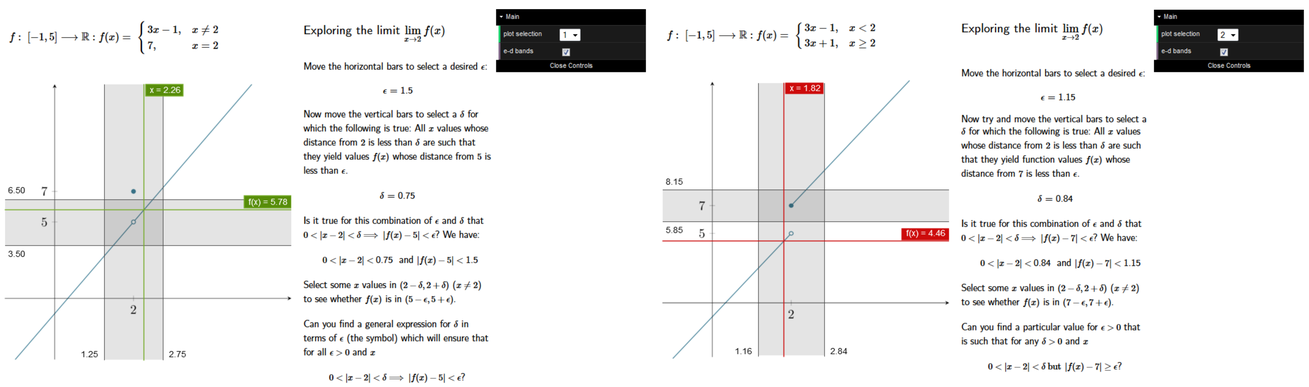
The Central Limit Theorem



What: An interactive online application that enables exploration of the Central Limit Theorem (CLT).

How: Samples are drawn from a population of grey-scale squares (representing real numbers between 0 and 100) and their means are shown to distribute normally. This is a key concept underpinning the CLT.

δ-ϵ definition of the limit



What: An interactive online application that enables exploration of the first-principles definition of the limit.

How: Neighbourhoods around the codomain value 5 and domain value 2 are selected for which the so-called δ-ϵ condition, $0 < |x-2| < \delta \implies |f(x)-5| < \epsilon$, is true or false. This is an important step in making (formal) sense of the statement $\lim_{x \to 2} f(x) = 5$

* Jim Pettigrew (j.pettigrew@uws.edu.au), Don Shearman, Carmel Coady, Lyn Armstrong, John Nicholls, Harkirat Dhindsa, Susan McGlynn