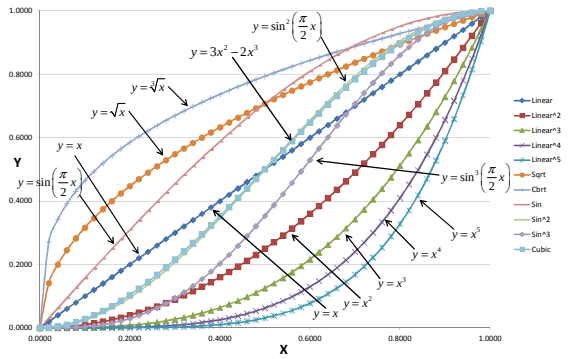
Fun With One



Moral: There are many ways to turn [0.-1.] into [0.-1.]

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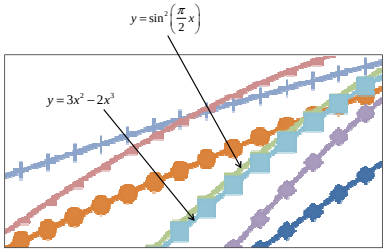
Why Do These Two Curves Match So Closely?



The Taylor Series expansion of $y = \sin^2\left(\frac{\pi}{2}x\right)$ around x=0.5 is:

$$y = \left(\frac{1}{2} - \frac{\pi}{4} + \frac{\pi^3}{96}\right) + x\left(\frac{\pi}{2} - \frac{\pi^3}{16}\right) + x^2\left(\frac{\pi^3}{8}\right) - x^3\left(\frac{\pi^3}{12}\right)$$

$$= .038 - .37x + 3.88x^2 - 2.58x^3$$

which is somewhat close to: $y = 3x^2 - 2x^3$

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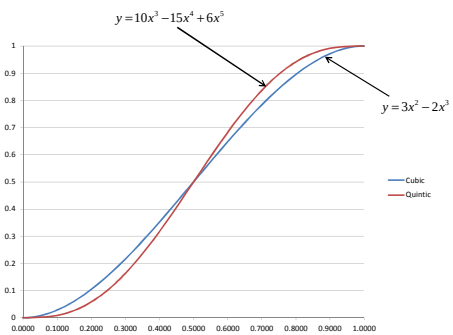
Cubic vs. Quintic



Both go from 0. to 1.
Both have initial and final slopes of 0.
The quintic has initial and final curvatures of 0.

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