3.6 Exercises Problem 3

Gene Quinn

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Find the mode of a random variable X with pdf

$$4(x - x^3) \quad 0 \leq x \leq 1$$

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The mode is the value of x that maximizes the pdf (if there is one).

To find the critical values of x, set the first derivative equal to zero:

$$f'(x) \;=\; 4(1-3x^2) \;=\; 0$$

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The two roots of this equation are $\pm 1/\sqrt{3}$. However, only the positive root lies in the interval $[0, 1]$.