

$$f(x) = \frac{1}{2} - \frac{x^2}{18}, \quad [0, 3]$$

$$b) P(0 \leq x \leq 0.5) = \int_0^{0.5} \left(\frac{1}{2} - \frac{x^2}{18} \right) dx$$

$$= \left[\frac{1}{2}x - \frac{x^3}{54} \right]_0^{0.5} = \frac{1}{2} \left(\frac{1}{2} \right) - \frac{\left(\frac{1}{2} \right)^3}{54}$$

$$= \frac{1}{4} - \frac{1}{432} = \frac{107}{432}$$

~~e) 1/2~~

$$\int_0^M \left(\frac{1}{2} - \frac{x^2}{18} \right) dx = \frac{1}{2}$$

$$\text{Median} = 1.04$$

$$c) \mu = E(X) = \int_0^3 x \cdot \left(\frac{1}{2} - \frac{x^2}{18}\right) dx = \frac{1}{8}$$

$$d) \text{variance} = \int_0^3 \left(x - \frac{9}{8}\right)^2 \left(\frac{1}{2} - \frac{x^2}{18}\right) dx$$

$$= 0,534$$

by hand

$$E(X^2) = \int_0^3 x^2 \left(\frac{1}{2} - \frac{x^2}{18}\right) dx$$

$$= \int_0^3 \left[\frac{x^2}{2} - \frac{x^4}{18} \right] dx$$

$$= \left[\frac{x^3}{6} - \frac{x^5}{90} \right]_0^3 = \frac{27}{6} - \frac{243}{90}$$

$$= \frac{305}{90} - \frac{243}{90} = \frac{162}{90}$$

$$= \frac{9}{5}$$

$$\begin{array}{r} 3 \\ 27 \\ \underline{15} \\ 135 \\ \underline{27} \\ 305 \end{array}$$

$$\text{Var}(X) = E(X^2) - [E(X)]^2$$

$$= \frac{9}{5} - \left(\frac{9}{8}\right)^2$$

$$= \frac{9}{5} = \frac{81}{64} = \frac{171}{320}$$

HW

be ready to find the mean, median, and mode of a continuous pdf
