[3.F06.25] You are given the following information about the probability generating function for a discrete distribution:

$$P'(1) = 2 \qquad P''(1) = 6$$

Calculate the variance of the distribution.

A. Less than 1.5

B. At least 1.5, but less than 2.5

C. At least 2.5, but less than 3.5

D. At least 3.5, but less than 4.5

E. At least 4.5

$$P'(1) = 2 = EX$$

$$P''(1) = E[X(X-1)] = 6$$

$$E[X^2 - X] = 6$$

$$EX^2 - EX = 6$$

$$EX^2 - 2 = 6$$

$$EX^2 = 8$$

$$Var\, X = 8 - 2^2 = 4$$