Let $X$ be a discrete random variable with pmf

$$p(x) = k x^2, \text{ for } x = 1, 2, 3.$$

(a) Calculate the value $k$ so that $p(x)$ is a probability mass function.

(b) Compute $P(X \leq 2)$

(c) Compute $E[X]$

(a) $1 = \sum_{x=1}^{3} k x^2 = k (1 + 4 + 9) = 14k$. Hence $k = \frac{1}{14}$.

(b) $P(X \leq 2) = f(1) + f(2) = \frac{1+4}{14} = \frac{5}{14}$.

(c) $E[X] = \sum_{x=1}^{3} k x^3 = \frac{1+8+27}{14} = \frac{36}{14} = \frac{18}{7}$.