1. Suppose X is a random variable with probability distribution function satisfying

$$f(-2) = \frac{1}{4}, \ f(-1) = \frac{1}{3}, \ f(1) = \frac{1}{4} \text{ and } f(2) = \frac{1}{6}$$

on the domain $x = -2, -1, 1, 2$. Compute the exact value of the following

$$\mathbb{E}\left(\frac{1}{X^2}\right).$$

You can just leave your answer as a sum of fractions.

$$\mathbb{E}\left[\frac{1}{X^2}\right] = \sum_x \frac{1}{X^2} f(x)$$

$$= \frac{1}{(-2)^2} f(-2) + \frac{1}{(-1)^2} f(-1) + \frac{1}{1^2} f(1) + \frac{1}{2^2} f(2)$$

$$= \frac{1}{4} \cdot \frac{1}{4} + \frac{1}{1} \cdot \frac{1}{3} + \frac{1}{1} \cdot \frac{1}{4} + \frac{1}{4} \cdot \frac{1}{6}$$

$$= \frac{1}{16} + \frac{1}{3} + \frac{1}{4} + \frac{1}{24}$$