True/False - No explanation needed. (For each: 1 point if correct, 0 points if not answered, -1 points if incorrect)

1. For any continuous or discrete random variable X with a well-defined mean μ and variance σ^2, it is true that $\mu^2 + \sigma^2 = E(X^2)$ True/False

2. Chebyshev's inequality guarantees that at least 75% of a distribution is within two standard deviations of the mean. True/False

Problems - Needs justification.

1. Compute the

   (a) mean

   (b) variance

   (c) mode

   of the random variable with PDF $f(x) = \frac{3}{2x^{2.5}}$ for $x \geq 1$ and $f(x) = 0$ otherwise. (10 points)