Chebyshev

1. Take the Pareto distribution $\frac{4}{x^5}$ for $x \geq 1$. What is the probability $P(\mu - 3\sigma < X < \mu + 3\sigma)$? What is bound Chebyshev gives us?

2. The RV X is a Laplace distribution with PDF $\frac{1}{2}e^{-|x|}$. What is $P(|X| > 3)$? What bound does Chebyshev give us?

3. Bubbles the clown blows up 100 balloons an hour, with a variance of 16 balloons. What is a lower bound on the probability Bubbles blows between 94 and 106 balloons?

4. What distribution that we have studied best models the random variable X, where X is the number of emails Nicole receives in an hour, assuming that she receives an average of 4? What is a formula for the exact value $P(X > 10)$? How can we estimate the probability $P(X > 10)$?

5. For the random variable X with PDF $f(x) = ce^{-cx}$ for $x \geq 0$, what is $P(\mu - 2\sigma < X < \mu + 2\sigma)$? What bound does Chebyshev give us?

6. Packer High School's high jump team jumps an average of 180 cm with a standard deviation of 8 cm. Assuming the distribution is normally distributed, what is the probability that someone on the team jumps to a height of at least 2 meters?