Math 341 Homework 8

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Problem 7

Problem 12

Problem 13

(a) Binomial Distrbution with $n = 100$ and $p = 0.05$ (success being a CI does not contain the mean μ).

(b)

$$P(3 \leq X < 8)$$
$$= P(X \leq 7) - P(X < 3)$$
$$= P(X \leq 7) - P(X \leq 2)$$
$$\approx 0.872039 - 0.1182629$$
$$\approx 0.7537765$$

(c)

$$Poisson \sim Bionmial$$
$$Y \sim Poisson(np)$$
$$\sim Poisson(5)$$

$$P(3 \leq Y < 8) = P(Y \leq 7) - P(Y < 3)$$
$$= P(Y \leq 7) - P(Y \leq 2)$$
$$\approx 0.866628 - 0.124652$$
$$\approx 0.7419763$$

(d) The poisson's approximation is a good approximation for the binomial distribution when n is large and p is small, and the two probabilities reflect this.