Math 153 - Quiz 7

April 7, 2016

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (5 points) A recent Gallup poll indicates that 63% of college students are in favor of their college banning the wearing of costumes that stereotype certain racial or ethnic groups. 125 college students are selected at random.

BINOMIAL $n = 125$, $p = 0.63$

(a) What is the probability that exactly 80 students are in favor of a ban?

$P(x = 80) = \text{binompdf}(125, 0.63, 80) \approx 0.07220$

(b) What is the probability that fewer than 70 are in favor of a ban?

$P(x < 70) = P(x \leq 69) = \text{binomcdf}(125, 0.63, 69) \approx 0.04449$

(c) How many students in the sample should be expected to support a ban?

$\mu = 125(0.63) = 78.75$

(d) What would be an unusually small number of students who are in favor of a ban?

$\sigma = \sqrt{(125)(0.63)(0.37)} = \sqrt{29.1375} \approx 5.40$

$\mu - 2\sigma = 78.75 - 10.80 = 67.95 \Rightarrow$ 67 or Fewer

2. (5 points) A certain Twitter user receives 8 tweets per hour, on average.

POISSON $\mu = 8$

(a) What is the probability that the user receives exactly 6 tweets in any given hour?

$P(x = 6) = \text{poissonpdf}(8, 6) \approx 0.1221$

(b) What is the probability that the user receives at least 9 tweets in any given hour?

$P(x \geq 9) = 1 - P(x \leq 8) = 1 - \text{poissoncdf}(8, 8) \approx 0.4075$

(c) What would be an unusually small number of tweets received in any given hour?

$\mu - 2\sigma = \mu - 2\sqrt{\mu} = 8 - 2\sqrt{8} \approx 2.34 \Rightarrow$ 2 or Fewer

(d) What is the probability that the user receives exactly 200 tweets in any given day?

$\mu = 192$

$P(x = 200) = \text{poissonpdf}(192, 200) \approx 0.02392$