Math 105
Summer 2019

Name:_____

Quick Hit 13

1. You are dealt a 5-card hand from a standard deck of cards. What is the probability that you are dealt exactly 2 queens given that you are dealt exactly 3 cards above a 10 (treat aces as high)?

$Q = \{x \mid x \text{ is a hand with exactly two queens}\}$

$T = \{x \mid x \text{ is a hand with exactly three cards above a } 10\}$

$n(Q \cap T) = \underbrace{{}_4C_2}_{\text{queens}} \underbrace{{}_{12}C_1}_{\text{not queen, } > 10} \underbrace{{}_{36}C_2}_{\leq 10} = 45360$

$n(T) = \underbrace{{}_{16}C_3}_{>10} \underbrace{{}_{36}C_2}_{\leq 10} = 352800$

$p(Q \mid T) = \frac{n(Q \cap T)}{n(T)} = \frac{45360}{352800} \approx .13$

2. You roll three six-sided dice. Are the events "rolling a sum of 5" and "rolling a 2 on the first die" independent?

$F = \{(1,2,2), (2,1,2), (2,2,1), (3,1,1), (1,3,1), (1,1,3)\}$

$T = \{(x,y,z) \mid x = 2\}$

$p(T \mid F) = \frac{n(T \cap F)}{n(F)} = \frac{2}{6} \approx .33$

$p(T) = \frac{n(T)}{n(S)} = \frac{36}{216} = \frac{1}{6} \approx .17$

~~Let~~ T and F are not independent.