Name: _____*Key*_____

Math 345 Elementary Statistics – Crawford

**Quiz 1-A/C**

14 February 2018

Books and notes (in any form) are not allowed. *Show your set-up and work.* Good Luck!

**1.** (5 pts) The following table summarizes data about head injuries in alpine skiers and snowboarders (based on data from the Journal of the American Medical Association).

|  |  | Head Injuries? | |
|---|---|---|---|
|  |  | Yes | No |
| Wore Helmet? | Yes | 96 | 656 |
|  | No | 480 | 2330 |

**(a).** If one of the subjects is randomly selected, find the probability of selecting someone who did not wear a helmet, given that the subject had head injuries.

$$96 + 480 = 576$$

$$P(NH \mid I) = \boxed{\frac{480}{576} \approx 0.833}$$

**(b).** If one of the subjects is randomly selected, find the probability of selecting someone who did not wear a helmet, given that the subject did not have head injuries.

$$656 + 2330 = 2986$$

$$P(NH \mid NI) = \boxed{\frac{2330}{2986} \approx 0.780}$$

**2.** (4 pts) The probability that a Tuff-n-Tread tire is defective is 0.0002. If 18 of these tires are used on one semi-truck, what is the probability that at least one of them is defective?
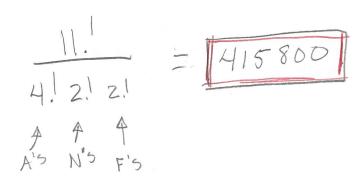
$$P(\text{At least of Defective}) = 1 - P(\text{None Def.})$$
$$= 1 - P(\text{All Good})$$
$$= 1 - (.9998)^{18}$$
$$\approx \boxed{0.00359}$$

$$\begin{cases} P(\text{Good}) = 1 - .0002 \\ = 0.9998 \end{cases}$$

**3.** (2 pts) How many different arrangements of the letters in BANFF CANADA are there?

$$\frac{11!}{4!\ 2!\ 2!} = \boxed{415800}$$

$$\underset{A's}{\uparrow}\quad \underset{N's}{\uparrow}\quad \underset{F's}{\uparrow}$$

**4.** (4 pts) Dr. Crawford collects 24 homework problems. She randomly selects 3 problems to grade.

**(a).** How many possible different groups of 3 problems could she choose?

order does **not** matter $\Rightarrow$ Combination

$$24\,C_3 = \boxed{2024} \quad \text{(From Calculator } n\ Cr \text{ option)}$$

$$\text{or} \quad 24\,C_3 = \frac{24!}{21!\ 3!} = \frac{24 \cdot 23 \cdot 22 \cdot 21!}{21!\ 3!} = \frac{24 \cdot 23 \cdot 21}{3 \cdot 2 \cdot 1} = 2024$$

**(b).** You did not do exactly 3 problems in the homework. What is the probability that the 3 she randomly picked are the same 3 you did not do?

$$P(\text{same}) = \frac{1}{2024} \approx \boxed{.000494}$$