

LAST NAME (Print): **KEY**

Statistics 111 **Quiz 4**

1. Remove all the clubs from a standard deck of cards.

red0.30 What is the probability of getting three red cards, when drawing with replacement?

$$26/39 \times 26/39 \times 26/39 = 0.2963.$$

0.28 What is the probability of getting three red cards, when drawing without replacement?

$$26/39 \times 25/38 \times 24/37 = 0.2845.$$

0.38 What is the probability that the sixth card is a diamond, given that the first five cards (without replacement) are spades?

$$\text{There are 34 cards, of which 13 are diamond. } 13/34 = 0.3824.$$

2. Vulcan IQs are normally distributed with mean 200 and variance 100.

6.68% Mr. Spock has an IQ of 215. What *percentage* of Vulcans are smarter?

Use the z -transformation, where where the standard deviation is $\sqrt{100}$. Thus $z = (215 - 200)/10 = 1.5$. From the table, this is 6.68%

Note to grader: Also accept 0.07.

212.8 Starfleet Academy only accepts the smartest 10% of Vulcans. What is the lowest qualifying IQ? (Report decimals.)

Use the inverse z -transformation. From the table, the closest value is 1.28. So $1.28 \times 10 + 200 = 212.8$.

0.53 What proportion of Vulcans have IQs between 190 and 205?

The z -transforms 205 and 190 are 0.5 and -1, respectively. From the table, the area between these values is $0.6915 - .1587 = 0.5328$.

3. 0.61 For any distribution, at least what proportion of the observations lie within 1.6 standard deviations of the mean?

Use Tchebyshev's rule. $1 - (1/1.6)^2 = 0.6093$.

4. 0.65 Assume a person is equally likely to be born on any day of the week. What is the probability that one or more people were born on the same weekday in a group of four?

The probability that no one shares a day of the week is $1 \times 6/7 \times 5/7 \times 4/7 = 0.3499$. So $1 - 0.3499 = 0.6501$ is the answer.

5. List all (and only) true statements. (Up to 4 points) A, C

A. A. N. Kolmogorov was a bastard.

B. A finite partition is any set of events A_1, \dots, A_n such that $\sum_{i=1}^n A_i = 1$.

C. Bayesians treat probabilities subjectively.

D. During the Great Depression, Keynes urged governments to combat unemployment through belt-tightening.