F Distribution and ANOVA: Review

Questions 1 – 2 refer to the following situation:

Suppose that the probability of a drought in any independent year is 20%. Out of those years in which a drought occurs, the probability of water rationing is 10%. However, in any year, the probability of water rationing is 5%.

EXERCISE 1

What is the probability of both a drought **and** water rationing occurring?

EXERCISE 2

Out of the years with water rationing, find the probability that there is a drought.

Questions 3 – 5 refer to the following survey:

Favorite Type of Pie by Gender

	apple	pumpkin	pecan	
female	40	10	30	
male	20	30	10	

EXERCISE 3

Suppose that one individual is randomly chosen. Find the probability that the person's favorite pie is apple **or** the person is male.

EXERCISE 4

Suppose that one male is randomly chosen. Find the probability his favorite pie is pecan.

EXERCISE 5

Conduct a hypothesis test to determine if favorite pie type and gender are independent.

Questions 6 – 7 refer to the following situation:

Let's say that the probability that an adult watches the news at least once per week is 0.60.

EXERCISE 6

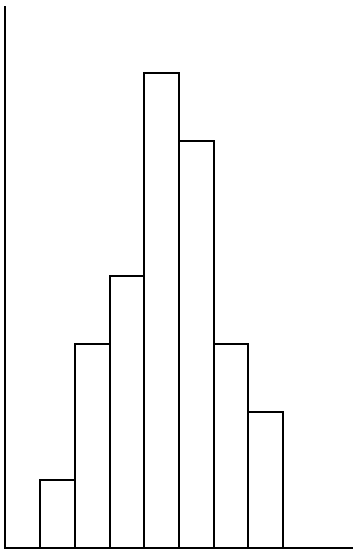
We randomly survey 14 people. On average, how many people do we expect to watch the news at least once per week?

EXERCISE 7

We randomly survey 14 people. Of interest is the number that watch the news at least once per week. State the distribution of X. X~

EXERCISE 8

The following histogram is most likely to be a result of sampling from which distribution?



A. Chi-Square
B. Geometric

C. Uniform
D. Binomial

EXERCISE 9

The ages of De Anza evening students is known to be normally distributed. A sample of 6 De Anza evening students reported their ages (in years) as: 28; 35; 47; 45; 30; 50. Find the probability that the average of 6 ages of randomly chosen students is less than 35 years.

Questions 10 – 12 refer to the following situation:

The amount of money a customer spends in one trip to the supermarket is known to have an exponential distribution. Suppose the average amount of money a customer spends in one trip to the supermarket is $72.

EXERCISE 10

Find the probability that one customer spends less than $72 in one trip to the supermarket?

EXERCISE 11

Suppose 5 customers pool their money. (They are poor college students.) How much money altogether would you expect the 5 customers to spend in one trip to the supermarket (in dollars)?

EXERCISE 12

State the distribution to use is if you want to find the probability that the **average** amount spent by 5 customers in one trip to the supermarket is less than $60.

EXERCISE 13

A math exam was given to all the fifth grade children attending Country School. Two random samples of scores were taken. The null hypothesis is that the average math scores for boys and girls in fifth grade are the same. Conduct a hypothesis test.

	n	$\bar{x}$	s^2
Boys	55	82	29

Girls	60	86	46

EXERCISE 14

In a survey of 80 males, 55 had played an organized sport growing up. Of the 70 females surveyed, 25 had played an organized sport growing up. We are interested in whether the proportion for males is higher than the proportion for females. Conduct a hypothesis test.

EXERCISE 15

Which of the following is preferable when designing a hypothesis test?

a. Maximize α and minimize β
b. Minimize α and maximize β
c. Maximize α and β
d. d. Minimize α and β

Questions 16 – 18 refer to the following situation:

120 people were surveyed as to their favorite beverage (non-alcoholic). The results are below.

Preferred Beverage by Age

	0 – 9	10 – 19	20 – 29	30 +		Totals
Milk	14	10	6	0		30
Soda	3	8	26	15		52
Juice	7	12	12	7		38
Totals	24	30	44	22		120

EXERCISE 16

Are the events of **milk** and **30 +** :

a. Independent events? Justify your answer.
b. Mutually exclusive events? Justify your answer.

EXERCISE 17

Suppose that one person is randomly chosen. Find the probability that person is **10 – 19** given that he/she **prefers juice**.

EXERCISE 18

Are **Preferred Beverage** and **Age** independent events? Conduct a hypothesis test.

EXERCISE 19

Given the following histogram, which distribution is the data most likely to come from?

a. uniform
b. exponential
c. normal
d. chi-square