

AP Stats POW #7

Answer each question as thoroughly as possible.

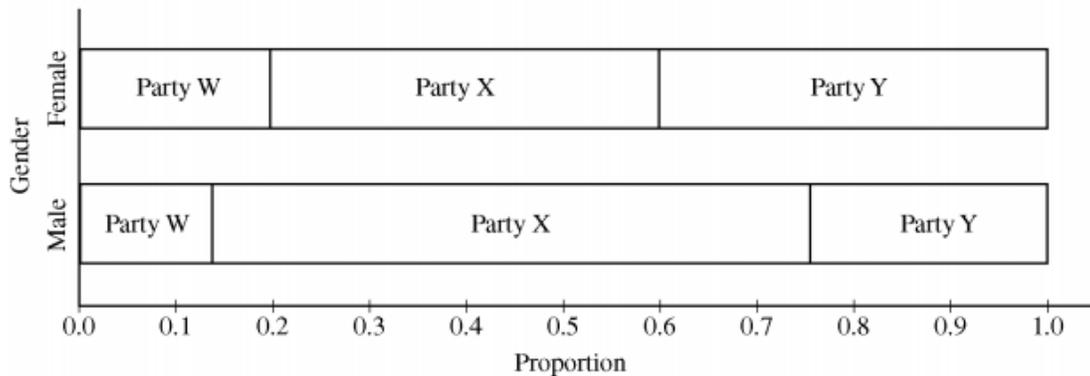
1. The table below shows the political party registration by gender of all 500 registered voters in Franklin Township.

PARTY REGISTRATION-FRANKLIN TOWNSHIP

	Party W	Party X	Party Y	Total
Female	60	120	120	300
Male	28	124	48	200
Total	88	244	168	500

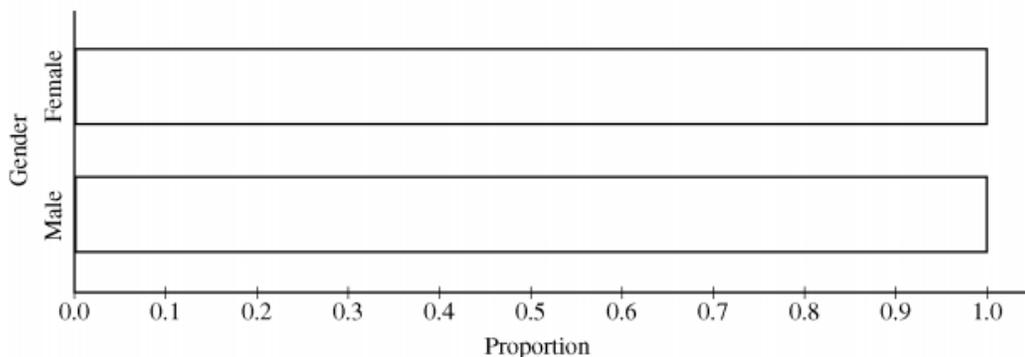
- a. Given that a randomly selected registered voter is a male, what is the probability that he is registered for Party Y?
- b. Among the registered voters of Franklin Township, are the events "is a male" and "is registered for Party Y" independent? Justify your answer based on probabilities calculated from the table above.
- c. One way to display the data in the table is to use a segmented bar graph. The following segmented bar graph, constructed from the data in the party registration - Franklin Township table, shows party-registration distributions for males and females in Franklin Township.

FRANKLIN TOWNSHIP

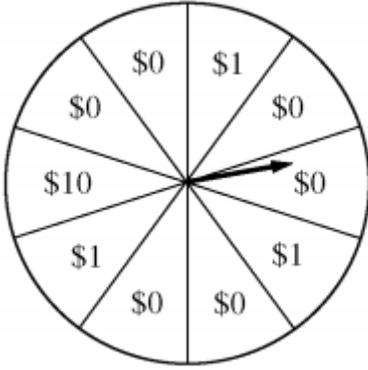


In Lawrence Township, the proportions of all registered voters for Parties W, X, and Y are the same as for Franklin Township, and party registration is independent of gender. Complete the graph below to show the distribution of party registration by gender in the Lawrence Township.

LAWRENCE TOWNSHIP



2. A charity fundraiser has a Spin the Pointer game that uses a spinner like the one illustrated in the figure below.



A donation of \$2 is required to play the game. For each \$2 donation, a player spins the pointer once and receives the amount of money indicated in the sector where the pointer lands on the wheel. The spinner has an equal probability of landing in each of the 10 sectors.

- a. Let X represent the net contribution to the charity when one person plays the game once. Complete the table for the probability distribution of X .

x	\$2	\$1	-\$8
$P(x)$			

- b. What is the expected value of the net contribution to the charity for one play of the game?
- c. The charity would like to receive a net contribution of \$500 from this game. What is the fewest number of times the game must be played for the expected value of the net contribution to be at least \$500?
- d. Based on last year's event, the charity anticipates that the Spin the Pointer game will be played 1000 times. The charity would like to know the probability of obtaining a net contribution of at least \$500 in 1000 plays of the game. The mean and standard deviation of the net contribution to the charity in 1000 plays of the game are \$700 and \$92.79, respectively. Use the normal distribution to approximate the probability that the charity would obtain a net contribution of at least \$500 in 1000 plays of the game.
3. A preliminary study conducted at a medical center in St. Louis has shown that treatment with small, low-intensity magnets reduces the self-reported level of pain in polio patients. During each session, a patient rested on an examining table in the doctor's office while the magnets, embedded in soft pads, were strapped to the body at the site of pain. Sessions continued for several weeks, after which pain reduction was measured. A new study is being designed to investigate whether magnets also reduce pain in patients suffering from herniated disks in the lower back. One hundred male patients are available for the new study.
- a. Describe an appropriate design for the new study. Your discussion should briefly address treatments used, methods of treatments assignment, and what variables would be measured. Do not describe how the data would be analyzed.
- b. Would you modify the design above if, instead of 100 male patients, there were 50 male and 50 female patients available for the study? If so, how would you modify the design? If not, why not?