Conditional Probability Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Statistics

1. Age and marital status of women (thousands)

Age

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 18-29 | 30-64 | 65 and over | Total |
| Married | 7842 | 43808 | 8270 | 59920 |
| Never Married | 13930 | 7184 | 751 | 21865 |
| Widowed | 36 | 2523 | 8385 | 10944 |
|  Divorced | 704 | 9174 | 1263 | 11141 |
| Total | 22512 | 62689 | 18669 | 103870 |

Find the following probabilities:

1. P(18-29) =
2. P(18-29 and married) =
3. P(married|18-29) =
4. P(widowed|18-29) =

Are you surprised that the probability for answer d is so much smaller than the answer for answer c? Why or why not?

1. P(at least 65) =
2. P(widowed and at least 65) =
3. P(widowed|at least 65) =
4. Slim is a professional poker player. He stares at the dealer, who prepares to deal. What is the probability that the card dealt to Slim is an ace? \_\_\_\_\_\_\_\_\_

This calculation assumes that Slim knows nothing about any cards already dealt. Suppose now that he is looking at 4 cards already in his hand, and that 1 of them is an ace. Slim’s probability of being dealt an ace, given what he knows, is \_\_\_\_\_\_\_\_\_\_\_\_.

Find these additional probabilities for Slim:

1. P(1st card is a diamond) =
2. P(2nd card is a diamond|1st card is a diamond) =
3. P(both cards are diamonds) =
4. The numbers of Nobel Prize laureates in selected sciences, 1901 to 1998, are shown in the table below:

|  |  |  |  |
| --- | --- | --- | --- |
| Country | Physics | Chemistry | Physiology/medicine |
| United States | 70 | 46 | 82 |
| United Kingdom | 21 | 26 | 24 |
| Germany | 61 | 17 | 29 |
| France | 25 | 11 | 7 |
| Soviet Union | 10 | 7 | 1 |
| Japan | 4 | 3 | 1 |

If a laureate is selected at random, what is the probability that

1. his or her award was in chemistry?
2. the award was won by someone from the United States?
3. the awardee was from the United States, given that the award was for physiology/medicine?
4. the award was for physiology/medicine, given that the awardee was from the United States?

(Use percents when giving the above probabilities)

1. Pierced Ears

|  |  |  |  |
| --- | --- | --- | --- |
| Gender | Yes | No | Total |
| Male | 19 | 71 | 90 |
| Female | 84 | 4 | 88 |
| Total | 103 | 75 | 178 |

Find the following probabilities:

1. P(pierced ears) =
2. P(male) =
3. P(male|pierced ears) =
4. P(pierced ears|male) =
5. Baby’s Hearing

|  |  |  |
| --- | --- | --- |
| Test Result | Loss | Normal |
| Loss | 54 | 6 |
| Normal | 4 | 36 |

The above table gives information on a hearing device, the Handtronix-OtoScreener, which is used to test the hearing of newborns.

1. Estimate the probability that this new device will show a hearing loss for a baby who actually has hearing loss.
2. Estimate the probability that this new device will show normal hearing for a baby who actually has normal hearing.
3. Estimate the chance that a baby with a hearing loss will pass the hearing test (test normal) using this device.
4. If the test shows that the baby has a hearing loss, what’s the estimated probability that the baby really has a hearing loss?
5. If you select a student at random from the school being described, what is the probability that the student has ridden a merry-go-round or a roller coaster, given the information about that school? Make a table to illustrate each situation.
6. In a particular school, 80% of the students have ridden a merry-go-round and 45% have ridden a roller coaster. Only 15% have done neither.
7. In another school, 30% of the students have ridden a merry-go-round but not a roller coaster. 45% have ridden a roller coaster but not a merry-go-round. Only 20% have done neither.