Conditional Probability

3. The probability that it is Friday and a Sarah is absent is $\frac{1}{20}$. Since the school week has 5 days, the probability it is Friday is $\frac{1}{5}$. If today is Friday, what is the probability that Sarah is absent?

4. An airline wants to determine if passengers not checking luggage is related to people being on business trips. Data for 1000 random passengers at an airport was collected and summarized in the table below.

	Checked Baggage	No Checked Baggage
Traveling for business	103	387
Not traveling for business	216	294

   a. What is the probability of traveling and not checking baggage?

   b. If the passenger is traveling for business, what is the probability of not having checked baggage?

5. In Canada, 92% of the households have televisions. 72% of households have televisions and Internet access. What is the probability that a house has Internet given that it has a television?

6. There is a 25% chance that Claire will have to work tonight and cannot study for the big math test. If Claire studies, then she has an 80% chance of earning a good grade. If she does not study, she only have a 30% chance of earning a good grade.

   a. Draw a diagram to represent this situation.

   b. Calculate the probability of Claire earning a good grade on the math test.

   c. If Claire earned a good grade, what is the probability that she studied?

7. A bag contains 4 blue marbles and 2 yellow marbles. Two marbles are randomly chosen (the first marble is NOT replaced before drawing the second one).

   a. What is the probability that both marbles are blue?

   b. What is the probability that both marbles are yellow?

   c. What is the probability of one blue and then one yellow? If you are told that both selected marbles are the same color, what is the probability that both are blue?

3. $\frac{1}{20} \div \frac{1}{5} = \frac{1}{4}$

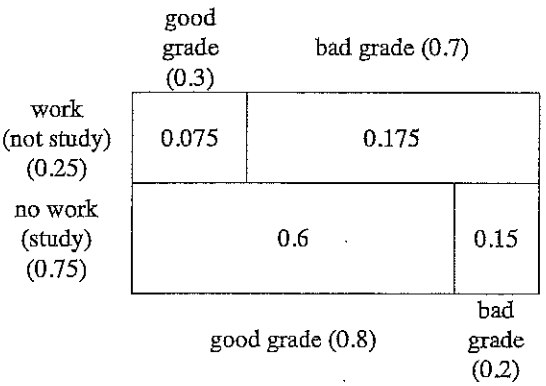
4. a. $\frac{681}{1000} = 0.681$ b. $\frac{387}{103+387} \approx 0.79$

5. $\frac{72\%}{92\%} \approx 78\%$

6. a. See diagram at right.

   b. $0.075 + 0.60 = 0.675 = 67.5\%$

   c. $\frac{0.60}{0.675} \approx 0.89$



7. a. $\frac{4}{6} \cdot \frac{3}{5} = \frac{2}{5}$

   b. $\frac{2}{6} \cdot \frac{1}{5} = \frac{1}{15}$

   c. $\frac{4}{6} \cdot \frac{2}{5} = \frac{4}{15}$

   d. $\frac{2}{5} \div (\frac{2}{5} + \frac{1}{15}) = \frac{6}{7}$

Combination + Permutation

Problems

Simplify the following expressions.

1. $10!$
2. $\frac{10!}{3!}$
3. $\frac{35!}{30!}$
4. $\frac{88!}{87!}$
5. $\frac{72!}{70!}$
6. $\frac{65!}{62!3!}$
7. ${}_8P_2$
8. ${}_{15}P_0$
9. ${}_9P_9$
10. ${}_{12}C_4$
11. ${}_5C_0$
12. ${}_{32}C_{32}$

Solve the following problems.

13. How many ways can you arrange the letters from the word "KAREN"?

14. How many ways can you arrange the letters from the word "KAREN" if you want the arrangement to begin with a vowel?

15. All standard license plates in Alaska start with three letters followed by three digits. If repetition is allowed, how many different license plates are there?

16. For $3.99, The Creamery Ice Cream Parlor will put any three different flavored scoops, out of their 25 flavors of ice cream, into a bowl. How many different "bowls" are there? (Note: A bowl of chocolate, strawberry, and vanilla is the same bowl as a bowl of chocolate, vanilla, and strawberry.)

17. Suppose those same three scoops of ice cream are on a cone. Now how many arrangements are there? (Note: Ice cream on a cone must be eaten "top down" because you cannot eat the bottom or middle scoop out, keeping the cone intact.)

18. A normal deck of playing cards contains 52 cards. How many five-card poker hands can be made?

Answers

1. 3,628,800
2. 604,800
3. 38,955,840
4. 88
5. 5,112
6. 43,680
7. 56
8. 1
9. 362,880
10. 495
11. 1
12. 1
13. $5! = 120$
14. $2(4!) = 48$
15. $(26)(26)(26)(10)(10)(10) = 17{,}576{,}000$
16. ${}_{25}C_3 = 2300$
17. ${}_{25}P_3 = 13{,}800$ (On a cone, order matters!)
18. ${}_{52}C_5 = 2{,}598{,}960$