Probability Questions

1. Suppose I pick a jelly bean at random from a box containing seven red and five blue ones. I record the color and put the jelly bean back in the box.What is the probability of getting a blue jelly bean both times if I do this twice? (Round your answer to three decimal places.

**5 x5 /12x12=25/144=.174(answer)**

1. Suppose I pick a jelly bean at random from a box containing four red and eight blue ones. I record the color and put the jelly bean back in the box.If I do this three times, what is the probability of getting a blue jelly bean each time? (Round your answer to three decimal places.)

**8x8x8/12x12x12=512/1728= .296(answer)**

1. The probability of passing the math class of Professor Jones is 64%, the probability of passing Professor Smith's physics class is 39%, and the probability of passing both is 30%. What is the probability of passing one or the other?

**64+39-30 =73%(ans)**

1. The probability of making the basketball team is 36%, the probability of making the softball team is 35%, and the probability of making one or the other is 50%. What is the probability of making both teams?

**50=36+35-x implies x=71-50 = 21%(ans)**

1. In one study, researchers at a clinic looked at more than 120,000 patients enrolled in 14 international studies in the past 10 years. Among the patients with heart problems, researchers found at least one risk factor in 84.9% of the women and 80.9% of the men.

If a woman is selected at random from the women with heart problems, what is the probability she has none of the risk factors? Write your answer as a percentage.

**Probability of getting no risk factor in a woman =100% - 84.9% = 25.1%**

If a man is selected at random from the men with heart problems, what is the probability he has none of the risk factors? Write your answer as a percentage.

**Probability of getting no risk factors in man is =100%-80.9% = 19.1%**

We can calculate odds if we know the probability. But we can also go the other way. Suppose the odds in favor of an event are 3 to 2. We can interpret this as saying that there are three (equally likely) favorable outcomes and two unfavorable ones. That is a total of five outcomes. So the probability of the event occurring is 3/5. In general, if the odds in favor are p to q, then the probability is

p/(p + q).

Suppose the odds against an event are 1 to 2. What is the probability that the event will occur?

(Give the probability as a decimal. Round your answer to three decimal places.)

**The probability that the event will occur is 1-1/3=2/3=.666( I substracted the probability of odd against event)(answer)**

What is the probability that the event will not occur? (Give the probability as a decimal. Round your answer to three decimal places.)

**1/3=.333(answer)**

Monty Hall was the host of the popular game show Let's Make a Deal. At the end of each show, some lucky contestant was given the opportunity to choose one of three doors. Behind one door was a nice prize, and behind the other two were lesser prizes or even worthless items. The contestant had no information about which door might hide the prize, so his or her probability of getting the nice prize was one-third.

An interesting variant of this scenario gained notoriety when columnist Marilyn vos Savant posed a related question in her Parade Magazine article of September 9, 1990. Here is the question as stated by Mueser and Granberg in 1999.

A thoroughly honest game-show host has placed a car behind one of three doors. There is a goat behind each of the other two doors. You have no prior knowledge that allows you to distinguish among the doors. "First you point toward a door," the host says, "then I'll open one of the other doors to reveal a goat. After I've shown you the goat, you may decide whether to stick with your initial choice of doors, or switch to the other remaining door. You win whatever is behind the door [you choose]."

The question is, should you switch doors or stay with your original choice? Or does it matter? The fun thing about this problem is that a number of PhD mathematicians got the wrong answer!

We will present two analyses below. One is right and the other is wrong. Which is right? Explain why you chose the answer you did. If you can't decide which is right and which is wrong, you should try the experiment suggested in the next exercise.

Analysis number 1: It doesn't matter whether you switch. The probability that I guessed right to begin with is 1/3. Either of the two remaining doors is equally likely to be a winning door or a losing door. One of them is certain to be a loser, and by telling me that one of the doors is a loser, the host has given me no new information on which to base my decision. Therefore, it makes no difference whether I change or not. In either case, my probability of winning is 1/3.

Analysis number 2: It does matter. You should switch doors. If I have initially chosen the right door, then changing will cause me to lose. This happens one time out of three.

Suppose I have chosen one of the losing doors and the host shows me the other losing door. Then if I change, I win. This happens two times out of three.

So the strategy of changing allows me to win two times out of three. My probability of winning is increased from 1/3 to 2/3.

a.Analysis 1 is correct

b**.** Analysis 2 is correct.

c. Both analyses are correct.

**d.Both analyses are incorrect.**

**Explanation**:

Analysis 2 seems to be correct in theory .but its probability calculation is wrong.

**It matters if I switch doors but the probability figure is wrong**

**See when the host says” then I'll open one of the other doors to reveal a goat”.A goat door is present in the other two doors , it indicates that the I have choosen already the wrong door behind which a goat is kept.so if the i switch to other doors , I may win.As promised if the host shows the door in which the other goat is present ,and I cleverly choose the last left door, I am 99% sure that I will win the car**

1. You draw a single card from a standard deck of 52 cards. What is the probability that it is not a queen?

Probability of getting a queen Is 52 cards is 4/52=1/13

**Probability of getting not queen is 1-1/13 =12/13(answer)**

1. You have a plate of 40 cookies. Ten have chocolate chips and 14 have pecans. Of the cookies mentioned in the preceding sentence, 4 have both chocolate chips and pecans. You select a cookie at random. What is the probability that your cookie has chocolate chips or pecans?

P(chocolate chips or pecans) =10+14-4 =**20 out of 40 cookies i.e 1/2 (answer)**

1. Someone says that the probability of rain is always 50 percent because there are two outcomes—either it rains or it does not. Decide whether you agree or disagree with this, and explain your reasons.

a.Agree - There are two possible outcomes so the probability of each will be 50%.

b.**Disagree - Just because there are two outcomes, doesn't mean they have to be equally likely**. (Answer)

1. A city finds empirically that an automobile going through the intersection of 5th and Main will run a red light sometime during a given day with probability 5.6%. What is the probability that an automobile will not run a red light at that intersection on a given day? Write your answer as a percentage.

**Since the events mentioned are conjugative to each other. The answer is 100-5.6%=94.4%**

1. Suppose there are five jelly beans in a box—three red and two green.

If a jelly bean is selected at random, what is the probability that it is red?

The probability that the jelly bean is red is **\_(3/5)\_(ans)\_\_\_**

Suppose there are five jelly beans in a box—two red and three green.

A friend claims that if a jelly bean is selected at random, the probability that it is red is 1/2 because there are two outcomes, red and green. Explain what's wrong with that argument.

**a.The argument is wrong because the number of each color jelly bean is not equal in the box, making the likelihood of getting a green jelly bean higher than getting a red jelly bean. (answer)**

**probability of green bean is 3/5 probability of red bean is 2/5(ans)**

b.The argument is wrong because the probability cannot be determined from the information given.

c. The argument is right since when there are two possible outcomes, the probability of each is 1/2.

d.The argument is wrong because the number of each color jelly bean is not equal in the box, making the likelihood of getting a red jelly bean higher than getting a green jelly bean.

1. Suppose there are 15 jelly beans in a box—2 red, 3 blue, 4 white, and 6 green. A jelly bean is selected at random.

What is the probability that the jelly bean is blue?

**3 c 1 / 15 c 1 = 3 / 15 = 1/5(ans)**

1. Suppose there are 15 jelly beans in a box—4 red, 6 blue, 4 white, and 1 green. A jelly bean is selected at random.

What is the probability that the jelly bean is red or blue? (Round your answer to the nearest whole number.)

 **Probability of getting red beans is = 4 c 1/15 c 1=4/15**

**Probability of getting blue bean is =6 c 1 /15 c 1 =6/15**

**Since both red and blue bean can not appear at once, both the events are independent of each Other**

**the total probability of getting red or blue bean will be = 10/15 =2/3=.666(ans)**

1. Suppose I pick a jelly bean at random from a box containing seven red and five blue ones. I record the color and put the jelly bean back in the box.

What is the probability of getting a red jelly bean both times if I do this twice? (Round your answer to three decimal places.)

**If a jelly bean out of box I can get a red jelly at first time is 7c1 and the second time also I taking one jelly of 7 red jelly bean(because I put it back in the box) so second time the probability of getting red jelly is 7c1 total probability will be**

**7c1 x 7c1 /12 x 12 = 49/144=.340**

1. Consider the experiment of tossing three coins.

What is the total possible number of outcomes?

**Cardinality of outcome set will be 2x2x2 =8 (ans) (H/T,H/T,H/T)**

1. Consider the experiment of tossing three coins.

What is the probability of getting at least one tail?

**If three coins are tossed at once.**

**Probability of getting no tail+ probability of getting least one tail =1**

**1/8+x=1**

**x=7/8(ans)**