

## Section 4.4 – Conditional Probability

MDM4U

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**Refer to part 1 of 4.4 lesson for help with the following questions**

**1)** Joel surveyed his class and summarized responses to the question, “Do you like school?”

	Liked	Disliked	No Opinion	Total
Males	12	5	2	19
Females	10	3	1	14
Total	22	8	3	33

Find each of the following probabilities:

**a)**  $P(\text{likes school} \mid \text{student is male})$

**b)**  $P(\text{student is female} \mid \text{student dislikes school})$

**2)** A person is chosen at random from shoppers at a department store. If the person’s probability of having blonde hair and glasses is  $\frac{2}{25}$  and the probability of wearing glasses is  $\frac{9}{25}$  determine the probability that a person has blonde hair given that they wear glasses.

**3)** From a medical study of 10 000 male patients, it was found that 2500 were smokers; 720 died from lung cancer and of these, 610 were smokers. Determine:

**a)**  $P(\text{dying from lung cancer} \mid \text{smoker})$

**b)**  $P(\text{dying from lung cancer} \mid \text{non – smoker})$

**4)** The table shows the results of a survey in which 146 families were asked if they own a computer and if they will be taking a summer vacation this year.

	Takes a Vacation	Does not Take a Vacation	Total
Owens a Computer	46	11	57
Does Not Own a Computer	55	34	89
Total	101	45	146

**a)** Find the probability a randomly selected family is taking a summer vacation this year given that they own a computer.

**b)** Find the probability a randomly selected family is taking a summer vacation this year and owns a computer.

***Refer to part 2 of 4.4 lesson for help with the following questions***

- 4)** What is the probability of being dealt two clubs in a row from a well---shuffled deck of 52 playing cards without replacing the first card drawn?
- 5)** A bag contains three red marbles and five white marbles. What is the probability of drawing two red marbles at random if the first marble drawn is not replaced?
- 6)** A road has two stop lights at two consecutive intersections. The probability of getting a green light at the first intersection is 0.6, and the probability of getting a green light at the second intersection, given that you got a green light at the first intersection, is 0.8. What is the probability of getting a green light at both intersections?
- 7)** Suppose the two joker cards are left in a standard deck of cards. One of the jokers is red and the other is black. A single card is drawn from the deck of 54 cards but not returned to the deck, and then a second card is drawn. Determine the probability of drawing:
- a)** one of the jokers on the first draw and an ace on the second draw
  - b)** a numbered card of any suit on the first draw and the red joker on the second draw
  - c)** a queen on both draws
  - d)** any black card on both draws

***Refer to part 3 of 4.4 lesson for help with the following questions***

- 8)** Tennis great Roger Federer made 63% of his first serves in 2011 season. When Federer made his first serve, he won 78% of the points. When Federer missed his first serve and had to serve again, he won only 57% of the points. Suppose we randomly choose a point on which Federer served.
- a)** Start by creating a tree diagram to model the situation.
  - b)** What is the probability that Federer makes the first serve and wins the point?
  - c)** What his the probability the he loses the point?
- 9)** Many employers require prospective employees to take a drug test. A positive result on this test indicates that the prospective employee uses illegal drugs. However, not all people who test positive actually use drugs. Suppose that 4% of prospective employees use drugs. Of the employees who use drugs, 90% would test positive. Of the employees who don't use drugs, 5% would test positive.
- a)** Start by creating a tree diagram to model the situation.
  - b)** A randomly selected prospective employee tests positive for drugs. What is the probability that he actually took drugs?