Math II

Probability Study Guide

Name: _____

Date: _____

1. A die is rolled and a coin is tossed. What is the probability of...

    a. getting heads given you've rolled a three   b. rolling a four and getting tails

2. At a high school, of the 153 11th graders, 74 students are enrolled in Chemistry, 35 are enrolled in Biology, and 24 are enrolled in both subjects. What is the probability a student is taking Chemistry or Biology?

3. Statistics show that at an insurance firm, 76% of the clients are male. 34% of the clients are accident free. If a client is to be chosen at random, what is the probability that the client is a male and is accident free?

4. A bag contains five red marbles, six yellow marbles, and eleven green marbles. If one marble is drawn randomly, what is the probability...?

    a. a green marble is not drawn

    b. a red marble then a green marble

5. A sandwich is made with only one type of bread, one type of meat, and one type of cheese. There are 3 types of bread: white, wheat, or rye; 2 types of meat: turkey or roast beef; and 2 types of cheese: American or Swiss.

a) Draw a tree diagram to model the different sandwiches you can make.

b) How many sandwich choices are there?

6. In a class of 33 students, 22 take Geography, 24 take Science, 20 take French, 17 take Geography and Science, 17 take Science and French, 13 take geography and French, and 12 take all three courses. Determine the probability that if a student is selected at random, the student does not take any of these 3 courses.

Style	Color
Regular	Light blue
Loose fit	Indigo
Boot cut	Washed
Slim fit	Black
	Blue

a. How many possible pairs of jeans are there if each pair has one style and one color?

b. Suppose you have one pair of jeans of each possible style and color in the table. What is the probability of choosing a pair of black jeans at random?

7. An insurance company selected drivers in a particular city to find a relationship between the age of the driver and the number of car accidents. Given the following table.

	1	2	3
17-25	15	23	40
25-40	50	44	56
Over 49	62	22	11

a. What is the probability someone chosen at random has had 2 accidents?

b. What is the probability someone chosen at random has had 1 accident given that they are 17-25?

c. Are Age of Driver and Number of Accidents in a year independent?

8. A survey is done and the results are tallied. If a person is selected at random, determine the probability that

	Child	Teenager	Adult
Blond hair	23	34	67
Brown hair	16	15	83
Other	24	21	70

a. They have brown hair given that they are not a child.

b. They are a child and they have other colored hair.

c. Are having blond hair and brown hair mutually exclusive? Explain.

9. Consider the following table:

a. Find P(no surgery).

b. Find P(death from disease).

c. Find P(no surgerydeath from disease).

d. Find P(surgery death from nondisease).

e. List two mutually exclusive events using the table.

	Method of losing Weight	
Cause of Death	No Surgery	Surgery
Death from Disease	285	150
Death from Nondisease	36	63

10. Given you are choosing two cards from a standard deck with replacement, compute the following probabilities

    a.   What is the probability of choosing a heart or a diamond?

    b.   What is the probability of choosing a black or a club?

    c.   What is the probability of choosing a 2 and a spade?

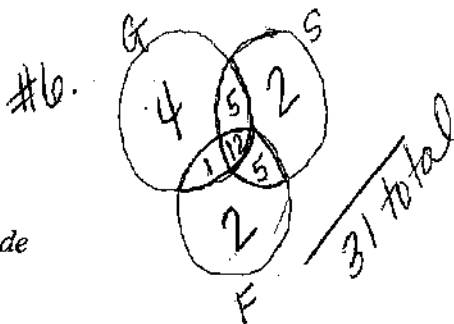   d.   What is the probability of choosing a 2 and an ace?

11. A bag contains 6 purple marbles and 7 white marbles. Two marbles are drawn at random. One marble is drawn and not replaced. Then a second marble is drawn. What is the probability that the first marble is while and the second one is purple?

Math II
Probability Study Guide

#6. [Venn diagram with circles labeled G, S, F: values 4, 5, 2, 1, 12, 5, 2 — "31 total"]

Name: Key
Date:

1. A die is rolled and a coin is tossed. What is the probability of...

   a. getting heads given you've rolled a three

   $$\frac{1}{6} \cdot \frac{1}{2} = \frac{1}{12} \sim 8\%$$

   b. rolling a four and getting tails

   $$\frac{1}{6} \cdot \frac{1}{2} = \frac{1}{12} \sim 8\%$$

2. At a high school, of the 153 11th graders, 74 students are enrolled in Chemistry, 35 are enrolled in Biology, and 24 are enrolled in both subjects. What is the probability a student is taking Chemistry or Biology?

   74 Chem
   35 Bio
   24 Chem + Bio /153 total

   $$\frac{74}{153} + \frac{35}{153} - \frac{24}{153} = \frac{85}{153}$$
   $$\sim 56\%$$

3. Statistics show that at an insurance firm, 76% of the clients are male. 34% of the clients are accident free. If a client is to be chosen at random, what is the probability that the client is a male and is accident free?

   .76 male
   .34 accident free

   $$.76 \times .34 = .2584 \sim 26\%$$

4. A bag contains five red marbles, six yellow marbles, and eleven green marbles. If one marble is drawn randomly, what is the probability...?

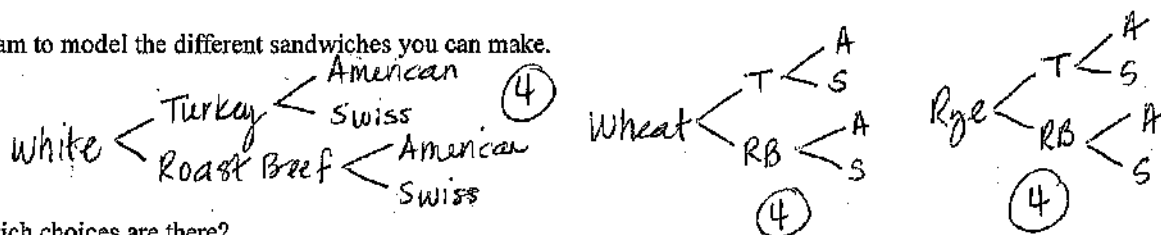   a. a green marble is not drawn $$\frac{11}{22} = 50\%$$

   b. a red marble then a green marble $$\frac{5}{22} \cdot \frac{11}{21} = 12\%$$

   5 R
   6 Y
   11 G
   22 total

5. A sandwich is made with only one type of bread, one type of meat, and one type of cheese. There are 3 types of bread: white, wheat, or rye; 2 types of meat: turkey or roast beef; and 2 types of cheese: American or Swiss.

   a) Draw a tree diagram to model the different sandwiches you can make.

   White < Turkey < American / Swiss ; Roast Beef < American / Swiss (4)

   Wheat < T < A / S ; RB < A / S (4)

   Rye < T < A / S ; RB < A / S (4)

   b) How many sandwich choices are there?

   $$3 \cdot 2 \cdot 2 = 12 \text{ choices}$$
   bread meat cheese

   or $$4 + 4 + 4 = 12 \text{ choices}$$

6. In a class of 33 students, 22 take Geography, 24 take Science, 20 take French, 17 take Geography and Science, 17 take Science and French, 13 take geography and French, and 12 take all three courses. Determine the probability that if a student is selected at random, the student does not take any of these 3 courses. (see diagram @ top of page) 2 don't take any

   22 G
   24 S
   20 F
   17 G+S
   17 S+F
   13 G+F
   12 G, S, +F
   33 total

7.

Style	Color
Regular	Light blue
Loose fit	Indigo
Boot cut	Washed
Slim fit	Black
	Blue

   a. How many possible pairs of jeans are there if each pair has one style and one color?

   $$4 \cdot 5 = 20$$

   b. Suppose you have one pair of jeans of each possible style and color in the table. What is the probability of choosing a pair of black jeans at random?

   $$\frac{4}{20} = \frac{1}{5} \sim 20\%$$

8. An insurance company selected drivers in a particular city to find a relationship between the age of the driver and the number of car accidents. Given the following table.

	1	2	3	
17-25	15	23	40	
25-40	50	44	56	150
Over 49	62	22	11	

127 89 107

7a. What is the probability someone chosen at random has had 2 accidents? $\frac{89}{323} \sim 28\%$

b. What is the probability someone chosen at random has had 1 accident given that they are 17-25? $\rightarrow \frac{15}{78} \sim 19\%$

c. Are Age of Driver and Number of Accidents in a year independent?

yes - according to the chart age doesn't influence total accidents.

9. A survey is done and the results are tallied. If a person is selected at random, determine the probability that

	Child	Teenager	Adult
Blond hair	23	34	67
Brown hair	16	15	83
Other	24	21	70

63 70 220

a. They have brown hair given that they are not a child. $\frac{Brown}{NOT A child} = \frac{98}{290} \sim 34\%$

b. They are a child and they have other colored hair. $\frac{24}{353} \sim 7\%$

c. Are having blond hair and brown hair mutually exclusive? Explain.

yes - you can't have both brown + blond (according to the chart)

10. Consider the following table:

a. Find P(no surgery). $\frac{321}{534}$

b. Find P(death from disease). $\frac{435}{534}$

c. Find P(no surgery death from disease). $\frac{285}{534}$

d. Find P(surgery death from nondisease). $\frac{63}{534}$

e. List two mutually exclusive events using the table.

surgery + no surgery
death from disease + nondisease

Cause of Death	Method of Losing Weight	
	No Surgery	Surgery
Death from Disease	285	150
Death from Nondisease	36	63

435
99
321 213 534

11. Given you are choosing two cards from a standard deck with replacement, compute the following probabilities

a. What is the probability of choosing a heart or a diamond? H or D $\frac{13}{52} + \frac{13}{52}$

b. What is the probability of choosing a black or a club? B or C $\frac{26}{52} + \frac{13}{52} - \frac{1}{52}$

c. What is the probability of choosing a 2 and a spade? 2 + spade $\frac{4}{52} \cdot \frac{13}{52}$

d. What is the probability of choosing a 2 and an ace? 2 + ace $\frac{4}{52} \cdot \frac{4}{52}$

12. A bag contains 6 purple marbles and 7 white marbles. Two marbles are drawn at random. One marble is drawn and not replaced. Then a second marble is drawn. What is the probability that the first marble is white and the second one is purple?

6 purple
7 white
13 total

W then P
$\frac{7}{13} \cdot \frac{6}{12}$

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