

1) (3 points each) Find the sample space associated with the following experiments:

a) Flip a coin 2 times:

$\{HH, HT, TH, TT\}$

b) Flip a coin 3 times:

$\{HHH, HHT, HTH, THH, HTT, THT, TTH, TTT\}$

2) (3 points each) After flipping a coin 3 times, find the probability of...

a) Getting exactly 1 head:

$$\frac{3}{8}$$

b) Getting at least 2 heads:

$$\frac{4}{8} = \frac{1}{2}$$

use this!

3) (3 points each) Consider a standard deck of cards.

a) How many Face Cards are there?

12

b) What is the probability of picking a Face Card?

$$\frac{12}{52} = \boxed{\frac{3}{13}}$$

c) How many Clubs are there?

13

d) What is the probability of picking a Club?

$$\frac{13}{52} = \boxed{\frac{1}{4}}$$

e) How many cards are Club Face Cards?

3

f) What is the probability of picking a face card or a Heart?

$$\frac{12 + 13 - 3}{52} = \frac{22}{52} = \boxed{\frac{11}{26}}$$

4) (4 points each) Dario has 12 markers in his bag, 4 of which are not working. Picking 3 markers at random, what is/are...

a) The probability they all work:

$$\frac{8}{12} \cdot \frac{7}{11} \cdot \frac{6}{10} = \frac{336}{1320} = \boxed{\frac{14}{55}}$$

b) The odds they all work:

$\boxed{14 \text{ to } 41}$

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5) (3 points each) Consider the chart below:

Age:	20 - 24	25 - 29	30 - 34	Total
Female	12	13	7	32
Male	18	9	12	39
Total	30	22	19	71

Picking one person at random, what is the probability that they are...

a) Female:

$$\frac{32}{71}$$

b) Female and between 25 - 29:

$$\frac{13}{71}$$

c) Female given they are between 25 - 29:

$$\frac{13}{22}$$

6) (4 points each) In a room of 40 people, 17 saw the movie *Wonder Woman* (WW), 14 people saw the movie *Spy*, and 6 people saw both. Picking a person at random, what is the probability that they:

a) Saw WW and *Spy*?

$$\frac{6}{40} = \frac{3}{20}$$

b) Saw WW given they saw *Spy*?

$$\frac{6}{14} = \frac{3}{7}$$

c) Saw WW given they didn't see *Spy*?

$$\frac{17-6}{40-14} = \frac{11}{26}$$

7) (3 points each) Three cards are picked, one at a time, from a standard deck of cards. Find the probability that you pick a Heart first, a Diamond second, and another Heart third if...

a) The cards are not replaced:

$$\frac{13}{52} \cdot \frac{13}{51} \cdot \frac{12}{50} = \frac{13}{950}$$

b) The cards are replaced:

$$\frac{13}{52} \cdot \frac{13}{52} \cdot \frac{13}{52} = \frac{1}{64}$$

8) (4 points) A multiple-choice test has 5 questions with 4 possible answers each. How many ways can you answer the questions? Assume none of the questions can be left blank.

$$4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 = 4^5 = 1024$$

9) (4 points) How many distinct permutations can be formed using all of the letters in the word ADDRESSEES?

$$\frac{10!}{1! 2! 1! 3! 3!} = 50400$$

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- 10) (4 points) A room is full of 12 artists, 7 financial advisors, 8 highly trained dolphins, and 4 less scary clowns. A committee is to be formed that contains 12 people to rid the world of the Monday blues. What is the probability that exactly 3 people from each group? Assume dolphins are people.

$$\frac{C(12,3) \cdot C(7,3) \cdot C(8,3) \cdot C(4,3)}{C(31,12)} = \frac{1,724,800}{141,120,525}$$

- 11) (3 points) Martha and Stewart are having a party where they invited 3 women and 3 men. Assuming everyone arrives at a different time, what is the probability that the women are the first three guests and the men are the last three guests?

$$\frac{3 \cdot 2 \cdot 1 \cdot 3 \cdot 2 \cdot 1}{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = \frac{1}{20} \quad \text{or} \quad \frac{P(3,3) P(3,3)}{P(6,6)}$$

- 12) (3 points each) Short answer. When writing the answer to a question that give the following directions, how can you write your answer?

- a) "What is the probability that..." b) "What are the odds that..."

in the videoooooo

- 13) (3 points each) Earlier this year, it was found that 44.5% of internet users choose Google Chrome. Picking 5 internet users, found the probability, written as a percent rounded to four decimal places, that...

- a) They all use Google Chrome:

$$C(5,5) (0.445)^5 (0.555)^0 = 1.7450\%$$

- b) Exactly 3 use Google Chrome:

$$C(5,3) (0.445)^3 (0.555)^2 = 27.1435\%$$

- 14) A raffle is being held where 1,000 tickets were sold for \$20 each. One first place ticket brings in a prize of \$500. Two second place prizes are for \$200 each. Five third place prizes are for \$100 each. Rounding answers (in dollars) to two decimal places...

- a) (6 points) What is the expected net value of the game?

$$\frac{1}{1000} \cdot 480 + \frac{2}{1000} \cdot 180 + \frac{5}{1000} \cdot 80 + \frac{992}{1000} (-20) = -18.60$$

- b) (2 points) Is the game fair to play? Why or why not?

Nope! EU was negative

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