- 1) (3 points each) Find the sample space associated with the following experiments: a) Flip a coin 2 times:
  - b) Flip a coin 3 times:

{HH, HT, TU, TTS

{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:

b) Getting at least 2 heads:

- 3) (3 points each) Consider a standard deck of cards.
- a) How many Face Cards are there?

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

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

c) How many Clubs are there?



d) What is the probability of picking a Club?

e) How many cards are Club Face Cards?

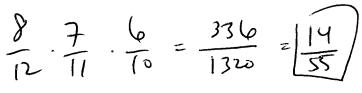


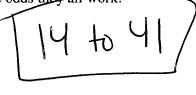
f) What is the probability of picking a face card or a Heart?

$$\frac{12+13-3}{52} = \frac{22}{52} = \left| \frac{11}{24} \right|$$

- 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:

b) The odds they all work:



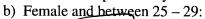


## 5) (3 points each) Consider the chart below:

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...

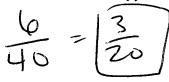








- 6) (4 points each) In a room of 40 people, 17 saw the movie *Wonder Woman (WW)*, 14 people saw the movie *Spy*, and 6 people saw both. Picking a person at random, what is the probability that they:
- a) Saw WW and Spy?



- 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:

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

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.

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

$$\frac{10!}{1!2!1!3!3!} = 50.400$$



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.

$$\frac{C(12,3) \cdot C(7,3) \cdot C(8,3) \cdot C(4,3)}{C(31,12)} = \frac{1724,900}{141,120,525}$$

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?

$$\frac{3.2.1.3.2.1}{6.5.4.321} = \frac{1}{100}$$
 or 
$$\frac{P(3.3) P(3.3)}{P(6.6)}$$

- 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..."

- 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)(.445) (.555)° = 1,7450%

- b) Exactly 3 use Google Chrome:

  ((5)3) (,445)<sup>3</sup> (,555)

  -(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 dellars) to true decided.
  - \$100 each. Rounding answers (in dollars) to two decimal places...
    a) (6 points) What is the expected net value of the game?

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

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