Math 105: Finite Mathematics

Homework 3: Due Feb 7, 2008

January 30, 2008

1 Sets

1.1

Twenty students gather to compare their schedules. They find that fifteen are enrolled in a humanities course and twelve are enrolled in a science course, while two are enrolled in neither. Draw a Venn diagram to illustrate the above sets and denote the size of each subset. How many students are enrolled in both a humanities course and a science course?

1.2

You draw seven cards from a standard deck of cards. Three cards are red, four cards are face cards, and your hand includes the Jack of Hearts and Queen of Diamonds as the only red face cards. How many cards are red or face cards? Is it possible to have the 3, 4 and 5 of Clubs in these seven cards?

2 Counting

2.1

In the game **SET**, a card has four properties: color, shape, shading and number of shapes. Each property is chosen from a set of three possible values:

- Color = Red, Green, Purple
- Shape = Oval, Squiggle, Diamond
- Shading = Light, Medium, Heavy

- Number of Shapes = One, Two, Three

If each card is unique and there is one of each possible card, how many cards are in the deck?

2.2

How many different 6-place license plates are possible in the state of Louisiana, if the first 3 places are to be occupied by letters and the final 3 by numbers?

3 Probability

3.1

You roll a six-sided die and an eight-sided die. What is the probability of rolling at least a six as the sum of the two values rolled?

3.2

A Magic 8-ball hides inside a 20-sided die.To use a Magic 8-ball, you shake it and ask a yes/no question, and one of the faces of the die will float to the opening to reveal the answer to your question. What is the chance of getting the answer "Outlook not so good" to three successive questions?

3.3

The possible answers on a Magic 8-ball fall into three categories: 10 are affirmative, 5 are negative, and 5 are non-commital. What is the chance of receiving one answer from each category to three successive questions?

3.4

A standard 52-card deck is shuffled, and you draw two of these cards, an 8 of Clubs and a 9 of Diamonds. What is the chance that the next card drawn is a Diamond? What is the chance that the next card drawn will keep the sum of the three cards less than or equal to 21 (assuming that Aces are worth 1 point and face cards are worth 10.) ?

3.5

What is the probability of rolling at least one 6 or 7 when rolling an 8-sided die 15 times?