Notes and Clarifications

- Final on Thursday
- Last chance for extra credit questions.
1. A die is rolled. What is the probability that the number rolled is greater than 2 and even?

2. A standard deck of cards is shuffled and one card is drawn. Find the probability that the card is red or a jack.

3. Joleen is on a shopping spree. She buys six tops, three shorts and 4 pairs of sandals. How many different outfits consisting of a top, shorts and sandals can she create from her new purchases?

4. To win a lottery game, a player may choose 4 numbers between 1 and 60. Each number may only be chosen once. If all 4 numbers match the winning numbers, regardless of order, the player wins. What is the probability that the winning numbers are 3, 15, 46, and 49?
Recurrence Relations

1. Give the closed form formula for the Fibonacci Sequence:

\[
\begin{align*}
  f_n &= f_{n-1} + f_{n-2} \\
  f_0 &= 0 \\
  f_1 &= 1
\end{align*}
\]
Sets, Set Partitions, Set Operations

1. Let $A = \{0, 1, 2, 3, 4, 5\}$, $A_1 = \{0, 1\}$, $A_2 = \{2, 3\}$, $A_3 = \{4, 5\}$. Is $\{A_1, A_2, A_3\}$ a partition of $A$?

2. Consider the sets: $R_0 = \{x \in \mathbb{Z} \mid x = 2k \text{ for some integer } k\}$ and $R_1 = \{x \in \mathbb{Z} \mid x = 2k + 1 \text{ for some integer } k\}$. Is $\{R_0, R_1\}$ a partition of $\mathbb{Z}$?

3. Let $A = \{a, b, c\}$, give $P(A)$ (The power set)

4. Let $A = \{1, 2, 3, 4\}$, $B = \{1, 3, 5, 7\}$, and $C = \{7, 9, 3\}$, and the universal set $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$. Locate all this information appropriately in a Venn diagram.

5. Let’s denote by $M$ and $B$ the students in a particular university that are studying mathematics and business. Write down the set that describes each of the following groups of students:
   a) students studying math but not business
   b) students studying either math or business
   c) students who study neither math nor business
Composition of Functions

1. If \( f(x) = -4x + 9 \) and \( g(x) = 2x - 7 \), find \( (f \circ g)(x) \)

2. If \( f(x) = -4x + 9 \) and \( g(x) = 2x - 7 \), find \( (g \circ f)(x) \)
Probabilities and Counting

1. You want to display your Chuck Norris dolls on your desk at school and there is only room for five of them. Unfortunately, you own 50. How many ways can you pick the dolls and arrange them on your desk?

2. When rolling two dice, what is the probability that you will roll a double?
Binomial Theorem

1. Expand: \((x + 3)^{12}\)
Homework (Extra Credit)

Binomial Theorem

1. Express $1296x^{12} - 4320x^9y^2 + 5400x^6y^4 - 3000x^3y^6 + 625y^8$ in the form $(a + b)^n$