

SJSU, Math 70, Practice Final, Instructor: Plamen Koev
Closed book, closed notes, no calculators.

Reference formulas:

Simple interest: $A = P(1 + rt)$

Compound interest: $A = P(1 + i)^n$, $i = r/m$

Future value of an annuity: $FV = PMT \frac{(1 + i)^n - 1}{i}$

Present value of an annuity: $PV = PMT \frac{1 - (1 + i)^{-n}}{i}$

Sets: $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

Probability: $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

Conditional probability: $P(A|B) = P(A \cap B)/P(B)$

Bayes: $P(U_1|E) = \frac{P(U_1 \cap E)}{P(E)} = \frac{P(U_1 \cap E)}{P(U_1 \cap E) + \dots + P(U_n \cap E)}$

1. (10 points) An annuity pays 6% annual interest rate compounded annually. If \$1000 is deposited into the annuity annually for two years, how much interest is earned during the second year?
2. (10 points) The annual payment on a 2-year loan is \$1000. The interest rate is 6% compounded annually. How much interest is paid over the the course of the loan?
3. (20 points) Compute the inverse of the matrix:

$$\begin{bmatrix} 1 & 2 & 3 \\ 3 & 5 & 11 \\ -1 & -1 & 4 \end{bmatrix}.$$

4. (10 points) Decide whether $[(p \rightarrow q) \vee \neg q] \Rightarrow \neg p \wedge q$.
5. (10 points) 50 students were surveyed. Of those 50 students, 22 had soccer as a hobby, 20 had tennis as a hobby, and 10 had neither soccer nor tennis as a hobby. What is the probability that a randomly chosen person has both soccer and tennis as a hobby?
6. (10 points) A 5 person team is selected from a group of 5 women and 5 men. What is the probability that the team will have exactly 3 men and 2 women?
7. A box contains 2 red, 3 white, and 4 green balls. Two balls are drawn out of the box in succession without replacement.
 - (10 points) What is the probability that both balls are the same color?
 - (10 points) If the second ball is red, what is the probability that both balls are the same color?