

1 Week 15 HOGU: 6.2, Final Exam Review Part 2

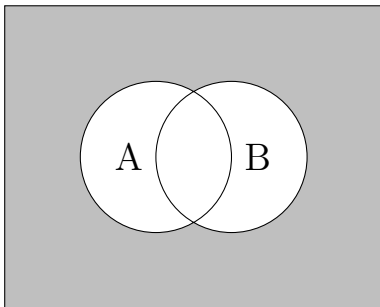
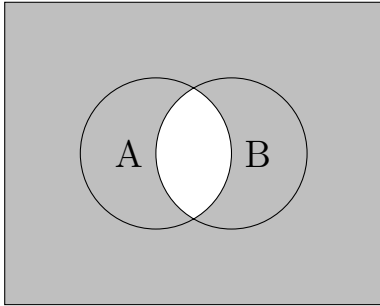
Problem 1. The John Weeks Enterprise is booming! The business needs to save up \$150,000 for a planned expansion. They make an initial deposit of \$25,000 and plan on depositing \$500 at the end of each month in T-bills, which currently yield 5.16% APR. Say that interest in these T-bills is compounded monthly. How many years will it take the John Weeks Enterprise to save up the \$150,000 they need?

Problem 2. You are building the boat “Sailing for Weeks”, which will currently cost \$44,750 to craft. You make a down payment of \$10,000 and finance the rest with a 10-year loan. The loan charges 7% interest, compounded quarterly.

- (a) After making quarterly payments on the boat for 3 years, how much of the principal of your loan is still unpaid?

- (b) After 3 years on your old loan above, you find a loan company that will refinance your loan at an APR of 5%, compounded quarterly, with a payment schedule that has you paying off the loan in 5 years! You decide to refinance your purchase and to make quarterly payments on the new loan. How much will your quarterly payments be?

Problem 3. Using union, intersection, and complements, how would you describe the shaded-in regions of these Venn diagram? (There is more than one correct answer.)



Problem 4. The following is a probability distribution with a missing entry:

Outcome	1	2	3	4	5
Probability	$\frac{18}{100}$	$\frac{23}{100}$		$\frac{9}{100}$	$\frac{33}{100}$

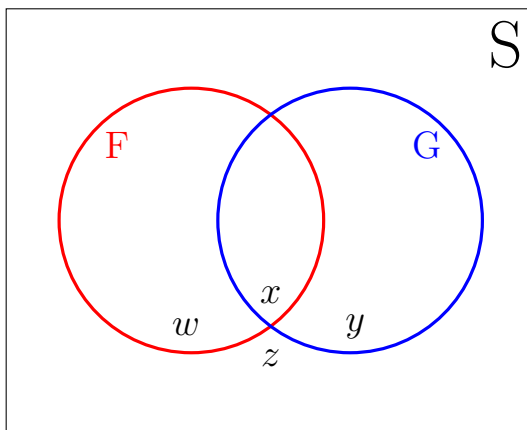
Let $A = \{1, 3, 5\}$ and let $B = \{2, 4, 5\}$. What is $P(A \cup B^C)$?

Problem 5. Given that F and G are two events of an experiment with $P(F) = 0.4$, $P(G) = 0.5$, and $P(F \cap G) = 0.2$, calculate the following probabilities:

(a) $P(F^C)$

(b) $P(F \cup G)$

(c) $P(F \cup G^C)$ (You may find the Venn diagram below helpful!)



Problem 6. A local group is sponsoring a game at the Renaissance Fair! A foolish jester asks you to pay \$1 to play the game, then flips a fair two-sided coin. As it is in the air, the player calls “heads” or “tails”. If the coin lands on the side the player called out, they win \$5! Otherwise, the player wins nothing.

- (a) Let X be the amount of *net winnings*, in dollars, that a player makes from playing this game. Write a probability distribution for X .

- (b) What is the expected amount of net winnings for the player? Is this a fair game?

Problem 7. Compute the domain of the following functions. Then state all holes and vertical asymptotes of the function. (Remember that, for holes, you must give an x - and y -coordinate. Write your answer as (x, y) .)

$$(a) f(x) = \frac{(x+3)^2}{(x-1)^2(x+3)}$$

$$(b) f(x) = \frac{(x+3)}{(x-1)^2(x+3)^2}$$

Problem 8. Find the domain of the following function:

$$f(x) = \begin{cases} \ln(-x) & \text{if } x \leq 2 \\ \sqrt{4-x} & \text{if } x > 3 \end{cases}$$

Problem 9. Solve the equation $e^{4x} = 5e^{7x}$ for x .

Problem 10. Write the expression $\frac{1}{3}\ln(x) - \ln(x + y) + 4\ln(2z)$ as a single logarithm. Assume all variables represent positive numbers.