

HOMEWORK 2

PROB. AND STAT. FOR ENG. (STAT:2020; BOGNAR)

1. Suppose A and B are independent events where $P(A) = 0.3$ and $P(B) = 0.4$.
 - (a) Find $P(B^c)$. *Show your work using clear notation.*
 - (b) Find $P(A \cup B)$. *Show your work using clear notation.*
 - (c) Find $P(A^c \cap B)$. *Show your work using clear notation.*
 - (d) Find $P(A^c \cup B)$. *Show your work using clear notation.*

2. *Potamopyrgus antipodarum* are a species of freshwater snails native to New Zealand. The probability a randomly selected young snail lives to adulthood is 70%, i.e. $P(A) = 0.70$.
 - (a) Suppose a researcher randomly selects 3 young snails (assume independence). Determine the probability that all live to adulthood. *Use notation such as A_1, A_2 , etc. Show your work using clear notation.*
 - (b) Suppose a researcher randomly selects 2 young snails (assume independence). Determine the probability that the first, second, or both snails live to adulthood. *Show your work using clear notation.*
 - (c) Suppose a researcher randomly selects 2 young snails (assume independence). Determine the probability that exactly 1 lives to adulthood. *Use notation such as A_1, A_1^c , etc. Show your work using clear notation.*
 - (d) Suppose a researcher randomly selects 5 young snails (assume independence). Determine the probability that 4 or fewer live to adulthood. *Hint: Use the complement rule. Show your work using clear notation.*
 - (e) Suppose a researcher randomly selects 3 young snails (assume independence). Determine the probability that exactly 2 live to adulthood. *Show your work using clear notation.*
 - (f) Suppose snails are repeatedly selected at random (assume independence). Determine the probability that the 4th selected snail is the 1st to live to adulthood. *Show your work using clear notation.*
 - (g) Suppose snails are repeatedly selected at random (assume independence). Determine the probability that the 4th selected snail is the 2nd to live to adulthood. *Show your work using clear notation.*