Homework 2 **Name:** _____

Prob. and Stat. for Eng. (STAT:2020; Bognar)

Print this pdf file, show your work in the provided space, use scanning app to scan pages (in order) into a single pdf file, submit in Gradescope. Be sure to get entire page in each shot — lay each page flat when scanning. You can use an iPad/tablet too. The Gradescope app works well for submitting too. Make sure the pages upload in order.

1. Textbook 2.56

   (a)

   (b)

2. Textbook 2.69

   (a)

   (b)

   (c)

3. Textbook 2.89

   (a)

   (b)

4. Textbook 2.92

5. Textbook 2.93

   (a)

6. 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.*

7. 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.*