

4. (9 points) The selling prices of new homes in the Saratoga Falls subdivision are given (in numerical order) on the attached sheet.

(a) At what percentile is a home that sells for \$272 thousand?

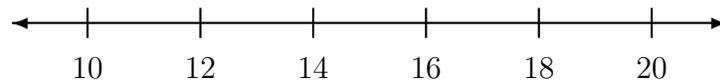
(b) Find the value at the 35th percentile.

(c) Find the value at the 83rd percentile.

5. (10 points) The following table shows the numbers of chocolate chips counted in each of 24 Hannaford Chocolate Chip cookies.

11	12	12	12	13	13	13	13	14	14	14	14
14	14	15	15	15	15	16	16	16	16	17	21

Determine the quartiles, the interquartile range, and the cutoff values for outliers. Then sketch the modified boxplot.



6. (6 points) Think carefully about the about the characteristics of a modified boxplot. For each part of this problem, sketch a boxplot that would correspond to a data set with the given properties.

(a) The range is just a little bit greater than the IQR.

(b) There are two outliers in the lower extreme.

7. (4 points) A PSC student is selected at random. Let A be the event that the student is taking a math class. Let B be the event that the student is a female. Are A and B disjoint (mutually exclusive)? Explain.

8. (4 points) Suppose the wicked witch of the east is hanging out at a random location in her big yard which measures 120 ft by 310 ft. Dorothy Gale's little house measures 12 ft by 10 ft, and a tornado is about to hurl the house into the witch's yard. What is the probability that the witch is smashed by the falling house? What type of probability are you assigning?

9. (3 points) Indicate whether each statement is true or false.

(a) _____ If A and B are disjoint (mutually exclusive), then $P(A \cup B) = 0$.

(b) _____ If D is an impossible event, then \overline{D} is a certain event.

(c) _____ If $P(X) = 0.4$ and $P(Y) = 0.3$, then it must be true that $P(X \cup Y) = 0.7$.

10. (8 points) Suppose A and B are events such that $P(A) = 0.46$, $P(B) = 0.68$, and $P(A \cup B) = 0.92$. Find each of the following.

(a) $P(A \cap B)$

(b) $P(\overline{A})$

(c) $P(A \cup \overline{A})$

(d) $P(\overline{A \cup B})$

11. (4 points) Given the probabilities $P(A) = 0.45$ and $P(B) = 0.65$, determine two things wrong with the conclusion $P(A \cup B) = 0.45 + 0.65$.

12. (5 points) Four letters are selected at random without replacement from the word *EYJAFJALLAJOKULL*. What is the probability of spelling the word *FAKE*?

13. (12 points) A letter is selected at random from the first box and placed into the second box. Then a letter is selected at random from the second box.

F F O O X

O O O O O X X

(a) Sketch the complete tree diagram for this experiment. Include the probabilities of each path.

(b) What is the probability of selecting at least one letter O?

(c) What is the probability of selecting at least one letter that is not F?

14. (10 points) During the last flu season, a number of adults participated in a double-blind study of the effectiveness of a new flu vaccine. The following data were collected.

	Caught the flu	Did not catch the flu
Took vaccine	37	259
Took placebo	97	232

A person from this study is selected at random.

- (a) What is the probability that the person caught the flu?
- (b) What is the probability that the person took the placebo?
- (c) What is the probability that the person took the vaccine and caught the flu?
- (d) What is the probability that the person did not take the placebo?
- (e) What is the probability that the person took the vaccine or caught the flu?

15. (7 points) A letter is selected at random from the first box and placed into the second box. Then a letter is selected at random from the second box. The outcomes are recorded as ordered pairs of letters such as (a, b) . (This problem is about **events** not probabilities.)

a a a b b c

a a b b b b

- (a) Find the sample space for this experiment.
- (b) Is each outcome in your sample space equally likely? Explain.
- (c) Let X be the event of drawing the letter b from the first box. What is \overline{X} ?
- (d) Let Y be the event of drawing the letter c from the second box. What is $X \cup Y$?
- (e) What is $X \cap Y$?