Please show your work and give justifications for your answers – if it is unclear how you reached an answer you may be asked to explain your answer in person to receive full credit.

(1) (required) Write down the names of any people who helped you on this take-home quiz, the URL’s of any web sites you used, and the title and author of any book you used (e.g. our text book).

(2) (15 pts) If the universal set \( U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} \) and sets \( A \) and \( B \) are \( A = \{1, 2, 3, 4, 5\} \), \( B = \{2, 4, 6, 8, 10\} \), what are:
   a) \( A \cap B \)
   b) \( A \cup B \)
   c) \( A \cap A \)

(3) (15 pts) Draw a Venn Diagram illustrating the set \( (A \cup B) \cap \overline{C} \).

(4) (20 pts) Twenty students were asked “Do you live on campus?”, “Do you have a job?” and “Do you own a pet?”. Here are the results:
   - 9 students live on campus
   - 12 have a job
   - 10 own a pet
   - 5 students live on campus and have a job
   - 6 students live on campus and own a pet
   - 7 students have a job and own a pet
   - 4 students live on campus, have a job and own a pet

   How many students don’t live on campus, don’t have a job, and do own a pet?

(5) (10 pts) How many different ways are there to rearrange the letters in the word MASSACHUSETTS? (Be sure to check your work!)

(6) (10 pts) How many different ways are there to mark off 2 of the 80 numbers on a Keno card? (See p. 187 of the text for a description of the game Keno. Be sure to explain any assumptions you make while solving the problem.)

(7) (15 pts) You record three shows on your replay TV: The Simpsons, Buffy the Vampire Slayer and Survivor. You can watch one show an evening and you have time to watch TV on four evenings this week. How many different ways can you choose to watch the shows? (Be sure to explain any assumptions you make while solving the problem.)

(8) (15 pts) A club has 40 members. How many ways can the club elect a President, Vice President and Treasurer and then appoint a 5 member steering committee if club officers are not allowed to serve on the steering committee?