Show **all** of your work on this assignment and answer each question fully in the given context.

Please staple your assignment!!

1. Chapter 5, Exercise 14 parts (a) and (b) only (page 325)
2. Chatper 5, Exercise 23 (page 327)
3. Chapter 5, Exercise 31 (page 329)
4. Suppose that X is a random variable with probability density function

$$f(x) = \begin{cases} c \cdot x^2 & -2 \leq x \leq 2 \\ 0 & o.w. \end{cases}$$

   a. Find the value of c that makes $f(x)$ a valid probability density function.
   b. Sketch the cumulative density function, $F(x)$.
   c. Find the probability that $|X| \geq 1$.

5. Consider a continuously distributed random variable, W, with a probability density function given by

$$f(w) = \begin{cases} \frac{1}{5(1-e^{-2})} e^{-w/5} & 0 \leq w \leq 10 \\ 0 & \text{otherwise} \end{cases}$$

   a. Graph the probability density function (carefully labeling important features).
   b. Show that the function $f(w)$ is a valid probability density function (i.e., show that (i) $f(w)$ is non-negative and (ii) $\int_{-\infty}^{\infty} f(w)dw = 1$).
   c. Find $P(W \leq 2)$
   d. Find $P(2 \leq W \leq 10)$
   e. Find $E(X)$