STAT324 HW 1B based on chapter3

Q1.

From a box containing 4 dimes(10 halalas) and 2 quarters(25 halalas), 3 coins are selected at random without replacement. Find the probability distribution for the total T of the 3 coins.

Q2.

From a box containing 4 black balls and 2 green balls, 3 balls are drawn in succession, each ball being replaced in the box before the next draw is made.
Find the probability distribution for the number of green balls.

Q3.

A continuous random variable X that can assume values between $x = 1$ and $x = 3$ has a density function given by $f(x) = 1/2$.
(a) Show that the area under the curve is equal to 1.
(b) Find $P(2 < X < 2.5)$.
(c) Find $P(X \leq 1.6)$.

Q4.

A continuous random variable X that can assume values between $x = 1$ and $x = 3$ has a density function given by $f(x) = kx$.
(a) Show that the area under the curve is equal to 1, for k = 0.25.
(b) Find $P(2 < X < 2.5)$.
(c) Find $P(X \leq 1.6)$.

Q5.

The probability distribution of X, the number of imperfections per 10 meters of a synthetic fabric in continuous rolls of uniform width, is given by

x	0	1	2	3	4
$f(x)$	0.41	0.37	0.16	0.05	0.01

Construct the cumulative distribution function of X.

Q6.

The waiting time, in hours, between successive speeders spotted by a radar unit is a continuous random variable with cumulative distribution function

$$F(x) = \begin{cases} 0, & x < 0, \\ 1 - e^{-8x}, & x \geq 0. \end{cases}$$

a) Find the probability density function of X.
b) Find the probability of waiting less than 12 minutes between successive speeders
   (i) using the cumulative distribution function of X;
   (ii) using the probability density function of X.

Q7.

A shipment of 7 television sets contains 2 defective sets. A hotel makes a random purchase of 3 of the sets. If x is the number of defective sets purchased by the hotel, find the probability distribution of X.

Q8.

Let W be a random variable giving the number of heads minus the number of tails in three tosses of a coin.
(a)List the elements of the sample space S for the three tosses of the coin and to each sample point assign a value w of W.
(b)Find the probability distribution of the random variable W, assuming that the coin is biased so that a head is twice as likely to occur as a tail.