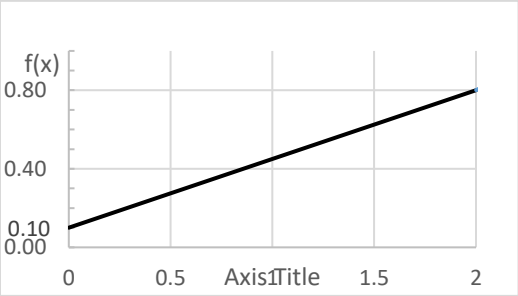
Exercise 01:

Let the random variable x has the following graphed probability density function (PDF):



1. What type is the above random variable? Find the probability density function?
2. Let the probability density function $f(x) = -\frac{1}{2}x + 1 \; when \; x \in [0,2]$
   a. Find the cumulative density function $F(x)$?
   b. Find $p(0.5 \leq x \leq 2), \; p(x < 1)$?
   c. Compute E(x) and V(x).
   d. Compute $E(2x+1) \; and \; V(2x+1)$?

Exercise 02:

Let x a random variable represents the average annual profit for a company has the following probability density function:

$$f(x) = \begin{cases} \frac{1}{\beta}(x+1) \; \ldots\ldots\ldots\ldots x \in [-1,5] \\ 0 \; \ldots\ldots\ldots\ldots\ldots x \notin [-1,5] \end{cases}$$

1. What type is the random variable x? Find the value of β, so that $f(x)$ is a probability density function?
2. Let F(x) be the cumulative probability density function for the above (PDF) $f(x)$ equals:
   $F(x)\left\{\frac{1}{36}(x^2+2x+1) \ldots\ldots\ldots x \in [-1,5]\right.$

a. Find the average annual profit and the standard deviation for this company?
b. Find $p(2 < x < 4), \; p(x < 1.5), p \; (x > 3)$?

Exercise 03:

Sketch a normal curve for a random variable x that has a mean of $\mu = 100$ and standard deviation of $\sigma = 10$. Label the horizontal axis with values of 70, 80, 90, 100, 110, 120 and 130.

Exercise 04:

Draw a graph for the standard normal distribution. Label the horizontal axis at values of -3, -2, -1, 0, 1, 2, and 3. Then use the table of probabilities for the standard normal distribution to compute the following.

a. $p(z \leq 1.5), p(z \geq 1.5)$
b. $p(z \leq 1)$
c. $p(1 \leq z \leq 1.5)$
d. $p(z \leq -1)$
e. $p(z \geq -1.25)$
f. $p(-2.5 \leq z)$
g. $p(-1.75 \leq z \leq -1.04)$

Exercise 05:

Given that z is a standard normal random variable, find z for each situation.

a. The area to the left of z is 0.9750 $\Rrightarrow p(z \leq ?) = 0.975$
b. The area between 0 and z is 0.4750 $\Rrightarrow p(0 < z < ?) = 0.475$
c. The area to the right of z is 0.132 $\Rrightarrow p(z > ?) = 0.132$
d. $p(z > ?) = 0.846$
e. $p(1 < z < ?) = 0.0537$

Exercise 06:

Let x a random variable that follows a normal distribution, with $\mu = 30$ and $\sigma = 25$. Calculate:

a. $P(x \leq 32)$
b. $p(x \geq 33$

c. $p(x \leq k) = 0.8413$

d. $p(20 \leq x \leq k) = 0.9544$

Exercise 07:

The average return for large-cap domestic stock funds over three years was 14.4%. Assume the three-year returns were normally distributed across funds with a standard deviation of 4.4%

a. What is the probability an individual large-cap domestic stock fund had a three-year return at least 20%
b. What is the probability an individual large-cap domestic stock fund had a three-year return of 10% or less.

c. How big does the return have to be to put a domestic stock fund in the top 10%for the three-year period?

Exercise 08:

Suppose that the mean daily viewing time of television is 8.35 hours. Use a normal probability distribution with a standard deviation of 2.5 hours to answer the following questions about daily television viewing per household.

a. What is the probability that a household views television between 5 and 10 hours a day?
b. How many hours of television viewing must a household have in order to be in the top 3% of all television viewing households?
c. What is the probability that a household views television more than 3 hours a day?

Exercise 09:

Excel RAND Function, most computer languages include a function that can be used to generate random numbers. In excel, the RAND function can be used to generate random numbers between 0 and 1. If we let x denote a random number generated using RAND, then x is a continuous random variable with the following probability density function.

$$f(x) = \begin{cases} 1 & for\ 0 < x < 1 \\ 0 & Elsewhere \end{cases}$$

a. Graph the probability density function?
b. What is the probability of generating a random number between 0.25 and 0.75?
c. What is the probability of generating a random number with a value less than or equal to 0.3?
d. What is the probability of generating a random number with a value greater than 0.6?
e. Compute the mean and standard deviation for the random numbers?

Exercise 10:

A survey found that the mean daily discretionary spending by Algerians earning over 90000 per month is 1360 DZD per day, the discretionary spending excluded vehicle purchases and regular monthly bills. Let x = the discretionary spending per day and assume that a uniform probability density function applies with $f(x) = 0.000625\ for\ a \leq x \leq b$.

a. Find the values of a and b for the probability density function PDF?
b. Find The cumulative Density function CDF?
c. What is the probability that consumers in this group have daily discretionary spending between 1000 and 2000?
d. What is the probability that consumers in this group have daily discretionary spending of 1500 or more?

e. What is the probability that consumers in this group have daily discretionary spending of 800 or less?