***QUESTION 3***

|  |  |  |  |
| --- | --- | --- | --- |
| Pardoned Person | A | B | C |
| A | 0 | 0.5 | 0.5 |
| B | 0 | 0 | 1 |
| C | 0 | 1 | 0 |

The first column represents the individual who is being pardoned, and the next three columns reflect those who will be informed by the governor that they are not being pardoned.

We now know that P(A)=P(B)=P(C)=1/3 at first, indicating that the individual will not be pardoned.

If the governor says that B will not be pardoned, it means that either A or C has been pardoned.

P(B not pardoned | A pardoned) = 0.5 ( table)

P(B not pardoned | C pardoned) = 1

P(B not pardoned | B pardoned) = 0

Now by using law of probability we get :

P( B not pardoned ) = P( B not pardoned | A pardoned ) P( A pardoned ) +P( B not pardoned | B pardoned ) P( B pardoned ) + P( B not pardoned | C pardoned ) P( C pardoned )  = (1/3)\*(0.5+1+0) = 0.5

Now, using Bayes conditional probability, we can calculate:

P(A pardoned | B not pardoned =

= =

As a result, that though B is not pardoned, the chances of A being pardoned are only 1/3.As a result, A's logic is indeed flawed.

***QUESTION 5***

***QUESTION A***

 Given that ****FY(v)= 1- α****. This implies

FY(v) = Y (y)dy = 1-α

Thus,

α = 1- Y (y)dy = 1-X (-y)dy since

fY (y) = fX (-y) as Y = -X

Sub x= -y

α = 1 +

Now as

Therefore,

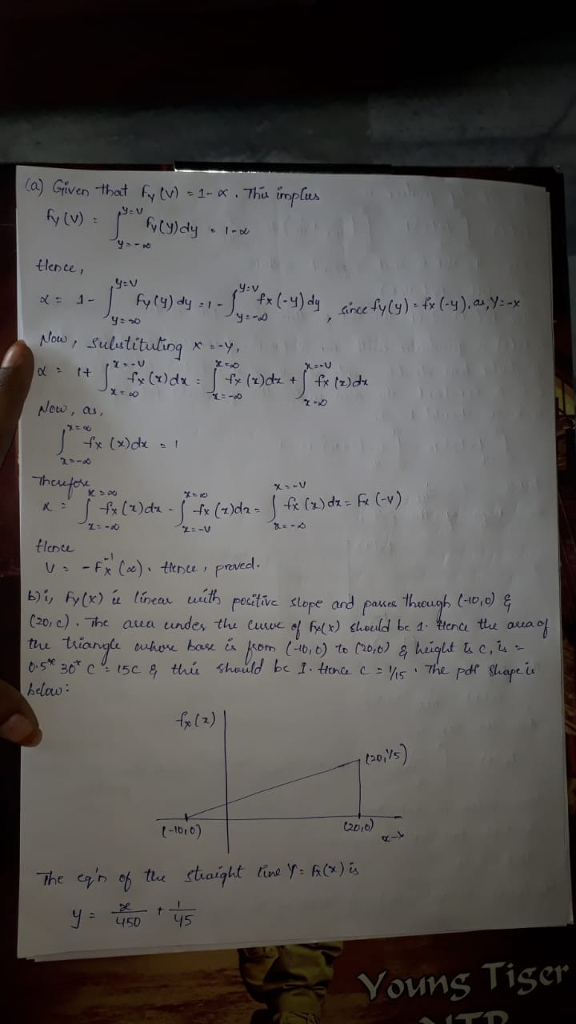
α =

Hence,

v =(α) hence proved.

QUESTION B.

fX(x) is a positive sloped linear function that moves through (-10,0) and (20, c). The region under fX(x)'s curve should be 1. As a result, the area of a triangle with a base of (-10, 0) and a height of c is = 0.5\*30\*c=15c, and this should be 1. As a result, c = 1/15.



The equation of the straight line y = fX(x) is

y = +

The CDF, by definition, is:

FX(x) =

(x^2 means x2)

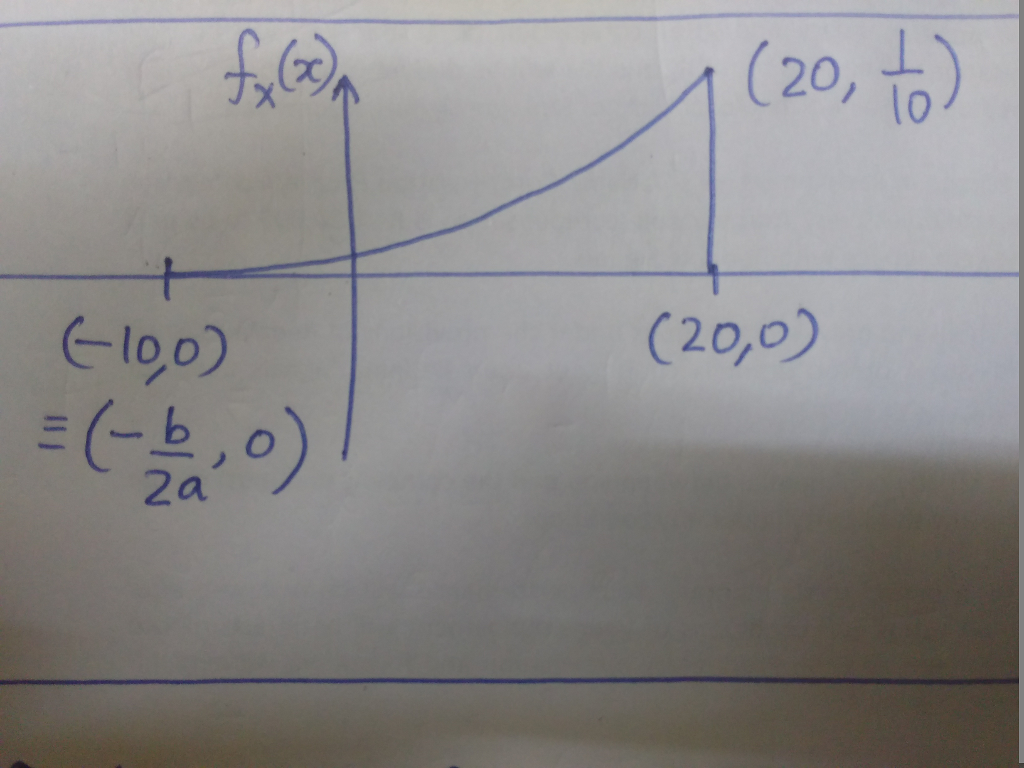
α = 0.01 = FX(-VαR)

Since Fx(-7) = 0.01 the Var for linear pdf = 7

ii)

fX(x) is a quadratic function with a minimum value at (-10, 0). The quadratic has double roots at -10 if the minimum is (-10, 0). So, f X(x)=c.(x+10)2 is the formula, where c is a constant. From x = -10 to x = 20, the field under the quadratic fX(x) should be 1:

c=



fX(x) = 2

CDF:

FX(x) = 2dz = 3 which is a cubic function

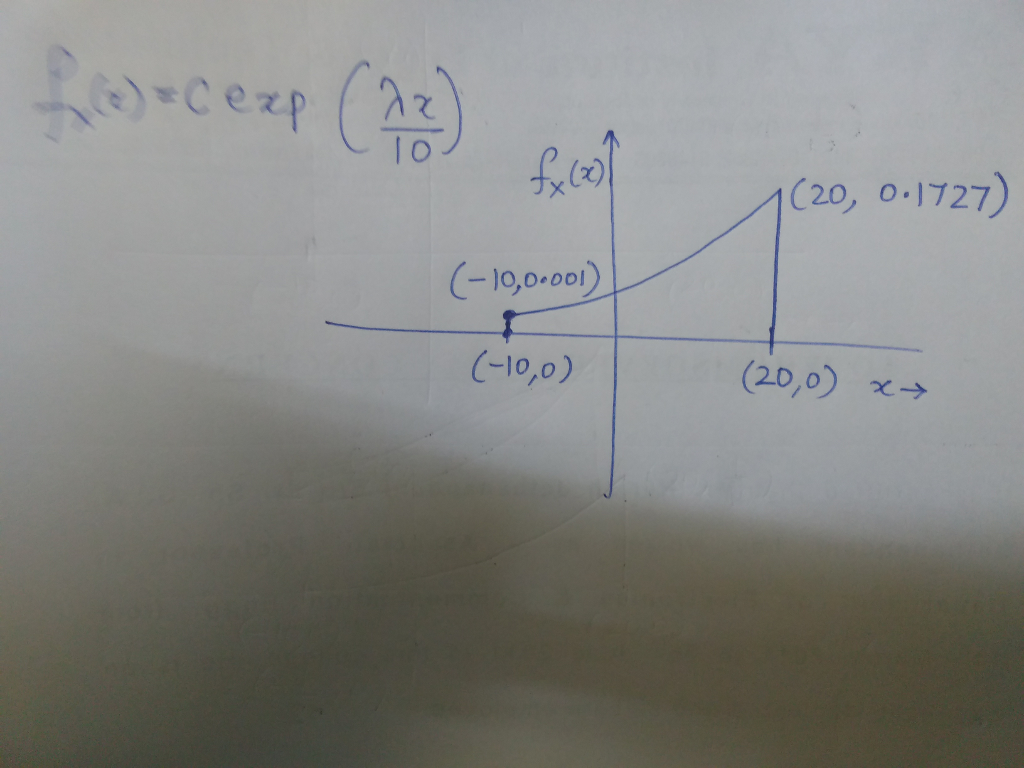
Var value is

Α = 0.01 = FX (-VaR) This gives,

VaR = 3.54

iii)

Fx (x) = c.exp(λx/10)



CDF;

FX(x) = *) ]*

*FX(x) =*0.0324\* exp(0.1717x) - 0.0058

Var value ;

Α = 0.01 = FX (-VaR) hence = 4.2

The VaR for the linear, quadratic, and exponential pdf forms is 7, 3.54, and 4.2, respectively. For the linear, quadratic, and exponential pdfs, the VaR in terms of X is 7 million dollars, 3.54 million dollars, and 4.2 million dollars, respectively. As a result, the form of pdf has an effect.

QUESTION C

Uniform pdf. fX(x) = 1/30 from (-10, 20).

FX(x) = dz = its linear

Var value is

α = 0.01 = FX(-VaR) thus VaR= 9.7

ii)

Fx(x) =

Hence, FX(x) =

Var is sensitive to pdf shapes.

***QUESTION 4***

A)

Each of the candidates who will be interviewed has an equal probability of becoming the better candidate.

As a result, when I applicants are interviewed, the chance of any applicant being the best is 1/i

As a result, the likelihood of the right nominee becoming one of the first r individuals = (1/i + 1/i + 1/i ...r times) = r/i.

B)

A stands for the event (we select the best candidate) and Bi stands for the event (we hire the best candidate)

 Furthermore, according to the chosen plan, none of the first r candidates can be chosen.

As a result, if I \small \leq r, the best candidate will be among the first r interviewed and will not be chosen.

It follows that P(A/Bi), which is the probability that (we select the best candidate, given that candidate no i is the best candidate and i≤ r) is equal to zero.

If i > r, P(A/Bi) = P(all candidates from (r+1) to (i-1) are rejected)

= P(candidate (r+1) is not the best among the 1st (r+1) X P( candidate (r+2) is not the best among the 1st (r+2) X ... P(candidate (i-1) is not the best among the first (i-1)

= r/(r+1) X (r+1)/(r+2) X ... (i-2)/(i-1) = r/(i-1)

C)

1. If r = 0, no candidates are simply interviewed with no expectation of being chosen.

Furthermore, since only one candidate has been interviewed up to that stage, the first candidate interviewed would be the best of the candidates interviewed so far. As a result, the first candidate will be chosen.

The likelihood of the first candidate interviewed and chosen being the right candidate is 1/n.

ii) for 0 < r < n, pr = Sum ( P(candidate i is the best) X P(we select candidate i)) over values of i from (r+1) to n

=  X r/(i-1) for values of i from (r+1) to n

= r/n    for values of i from (r+1) to n.

D)

q r = pr - pr-1 ,r = 1(1)

= -