	Simulation
	Thursday and
	Assignment 3 Platon
	V
	(1) Calculate: $\int_{1}^{\infty} e^{4} \sin(2\pi x) dx$ 73180068
	We need to find an faud a q function where f is a PDF in (-00,1). We will set f to be the Rayleigh distribution
	a PDF in (-a) 1) We will set f to be the Rayleigh distribution
	-2
	Rayleigh Distribution: $f(x;6) = \frac{x}{6^2} e^{\frac{-x^2}{26^2}}$
	62
_	Since we need the exponent of e to be -x2" we will set
	$6 = \sqrt{2}$
	Now that we have found a fitting distribution for the integral
	Now that we have found a fitting distribution for the integral coloulation, we need to normalize it. The normalization factor
	1 1/4
	is equal to e. 50 our f is: $f(x) = e^{\frac{x}{4}} \cdot \frac{x}{2} \cdot e^{\frac{1}{4}}$
	- 1/4
	oud this means our Q(x) = sin(2nx). 2.e
	X
	Algorithu
	G
	1. Final a fitting f
	2. Normalize it
	3. Find Q
-	4. Get a sample from t
	15. Calculate à and the variance

	2) Calculate 100 x2. e2. siu(nx) dx
	Colculate 1 x · e - siu(nx) dx
	Forthis groblem I have 2 solutions:
	The second secon
7.	Method 1
	Using again the Rayleigh distribution, we set 6=1 and we get:
	$f(x) = x \cdot e^{\frac{x^2}{2}}$
	This is always introduction to 1 of Re
	This is already integrating to I and fits our problem so there is no need for normalization this time.
	Our Q(x):
	Links and the Karpa Well of the second of th
	$P(x) = siu(n \cdot x) \cdot X$
	Note: The "issue" with this wethool is that if we look at
	the plot (which I included in a file) of a doesn't converge to the initial tection and we get they a good ô because the integrals of sin(n:x) concel each other while oscillating to infinity availed 0. I wasn't sure if this is entirely correct
	the internal at sincous and constant the internal at sincouse
	to juffigity available O I wasn't sure if this is entirely cornect
	or if its just a trick for ô, so I implemented one more wethor
*_ e * * a	Method 2
	On this mother was almost the Control of the
	On this method we choose the Gowna distribution to be the PDF.
. 4	CATTOEX.
	Gowner Distribution: f(x) = 1 (x) = 1
	On this method we choose the Gourna distribution to be the PDF. Gourna Distribution: $f(x) = \frac{1}{T(x) \cdot \theta^k}$

_	
_	We set k=3 and we get:
	10 > 3 -x (u) 1 1 do it wood now liagtion
_	$f(x) = x^2 \cdot e^{-x}$ (Which also doesn't need normalization)
-	
	And, $\varphi(x) = 2 \cdot \frac{\left(-\frac{x}{2} + 2x\right)}{2} \cdot \sin(nx)$
	And P(X) = Z' E · SIM(IIX)
	and but the first one is better
	Note: Both methods are great but the first one is better
_	
	The algorithm is identical as in 2.
_	3 Calculate J-1 VI-x2 dx
_	2) Caxara J-1 V-1 - X Cr
_	For this problem I will first after the range (-1,1).
_	$\int_{-1}^{1} \sqrt{1-x^2} dx = \int_{-1}^{0} \sqrt{1-x^2} dx + \int_{0}^{1} \sqrt{1-x^2} dx $
	But they are symmetrical so we can say:
_	$O = D 2 \cdot \int_{0}^{1} \sqrt{1-x^{2}} dx$
_	
	So for this aftered version we can use f(x)=1 which has an integral equal to 1 in (0,1) and is a proper PDF.
	au integral equal to 1 in (0,1) and is a proper PDF
	$50 (9(x) = \sqrt{1-x^2})$
	Ju Pythou we get N samples from the uniform distribution in (0,1) and then we create N extra samples that one identical to the
	and then we create N extra samples that are identical to the
	previous N but with an opposite sign. The A we get will not
	require any extra work. For the variance though, we calculate the
_	variouse just for (0,1) and then we have to multiply it by 2
_	since the volues over the twice as bij interval have a bigger
_	previous N but with an opposite sign. The A we get will not require any extra work. For the variance though we calculate the variance just for (0,1) and then we have to multiply it by 2 since the values over the twice as bij interval have a bigger distance from the mean.
_	The algorithm is identical as in D.