Statistical Computing HW 1

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```
library(knitr)
```

Problem 3.2)

Question

If $x_0 = 3$ and

$$x_n = (5x_{n-1} + 7) \ \ mod\ 200$$

find $x_1, ...x_{10}$.

Answer

The code below finds $x_1, ...x_{10}$:

```
# Create a dataframe to store the values
df2 <- data.frame(x_i=c(0:10), equals=rep(0,11))

# Initialize x0 = 3
df2[1,2] = 3

# Loop for x1 to x10
for (i in 1:10){
  df2[i+1, 2] = (5*df2[i, 2]+7) %% 200
}
```

```
# Print results
kable(df2)
```

x_i	equals
0	3
1	22
2	117
3	192
4	167
5	42
6	17
7	92
8	67
9	142
10	117

Problem 3.5)

Question

Use simulation to approximate

$$\int_{-2}^{2} e^{x+x^2} dx$$

Compare answer with the exact answer if known.

Answer

1) Derivation
2) Algorithm
3) Simulation
4) Analytical Result

Problem 3.6)

Question

Use simulation to approximate

$$\int_{0}^{\infty} x(1+x^2)^{-2} dx$$

Compare answer with the exact answer if known.

Answer

1) Derivation
2) Algorithm
3) Simulation
4) Analytical Result