ME 1020 Engineering Programming with MATLAB

Problem 7.17:

17. Suppose that $y = x^2$, where x is a normally distributed random variable with a mean and variance of $\mu_x = 0$ and $\sigma_x^2 = 4$. Find the mean and variance of y by simulation. Does $\mu_y = \mu_x^2$? Does $\sigma_y = \sigma_x^2$? Do this for 100, 1000, and 5000 trials.

```
% Problem 7.17
clear
clc
disp('Problem 7.17: Scott Thomas')

mux = 0;
variancex = 4;
sigmax = sqrt(variancex);
x1 = sigmax*randn(1,100) + mux;
x2 = sigmax*randn(1,1000) + mux;
x3 = sigmax*randn(1,5000) + mux;
y1 = x1.^2;
y2 = x2.^2;
y3 = x3.^2;
y1mean = mean(y1)
y2mean = mean(y2)
y3mean = mean(y3)
y1variance = var(y1)
y2variance = var(y2)
y3variance = var(y3)

muy = mux^2
variancey = variancex^2
```

```
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y1mean =

     4.6783e+000


y2mean =

     3.5945e+000


y3mean =

     4.0640e+000


y1variance =

    34.4373e+000


y2variance =
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    26.4519e+000

y3variance =

    31.6796e+000

muy =

     0.0000e+000

variancey =

    16.0000e+000
```