**STAT 13, section 1, Winter 2011, UCLA Statistics**
**HW 4; Problem Solution**

HW 4.1
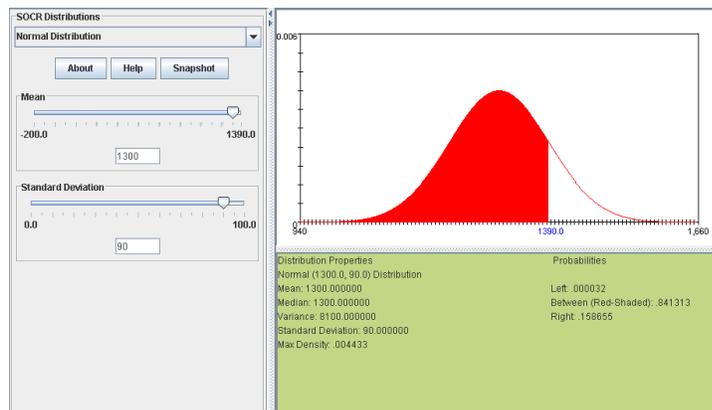
(a) P(Y <=1,390) = 0.841335
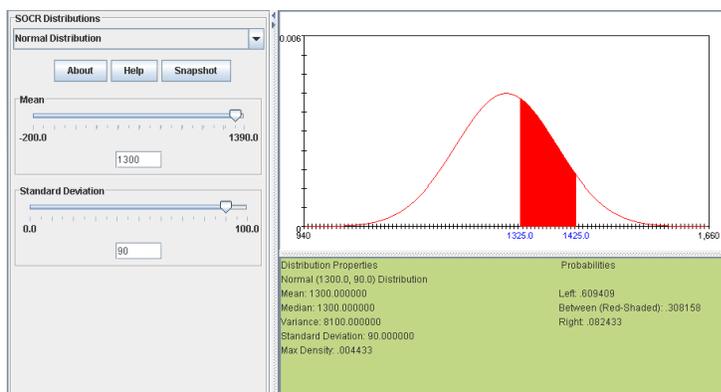
(b) P(1,325 <= Y <=1,425) =0.308158
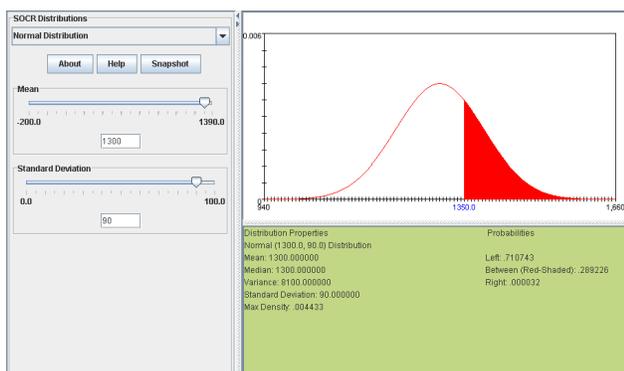

(c) P(1,350 <= Y) = 0.289258

(d) P(1,400 <= Y) = 0.133260
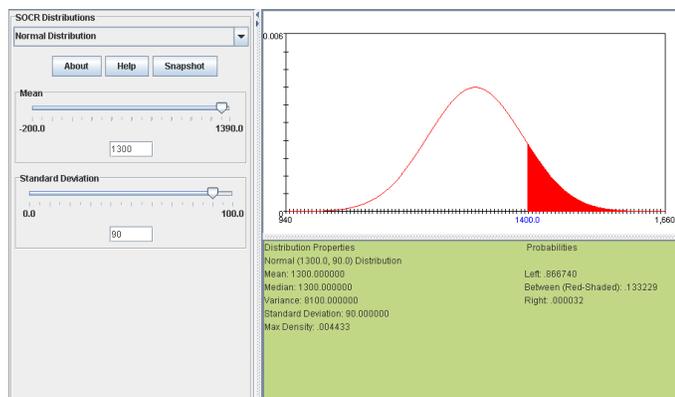
(e) P(1,400 <= Y <=1,500) = 0.120126
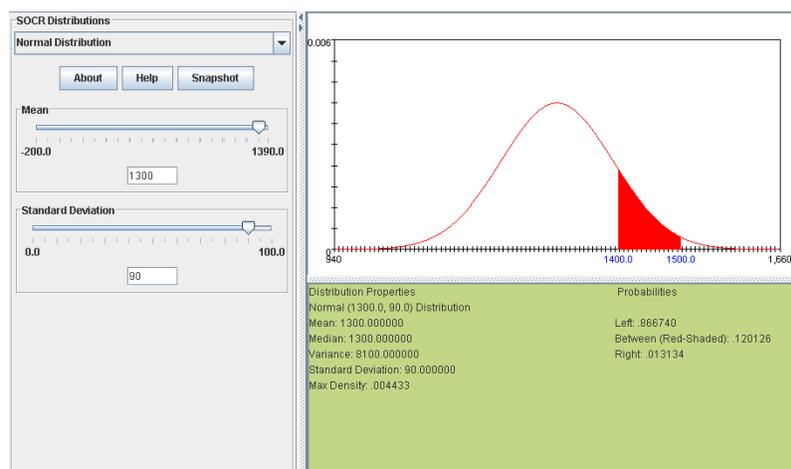


(f) P(1,300 <=Y <=1,350) = 0.210743
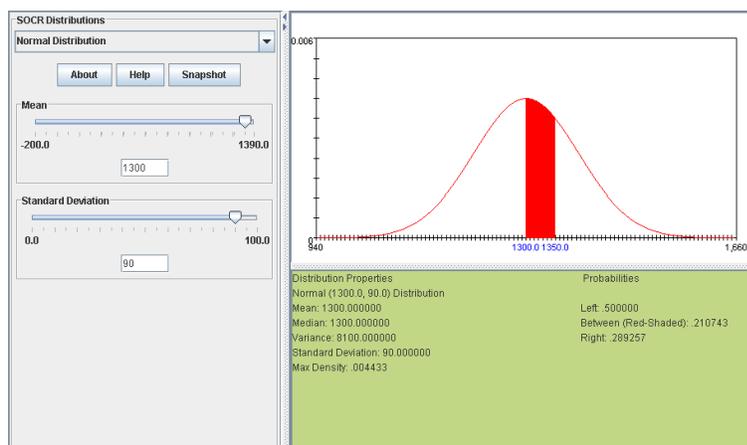
HW 4.2

Let Y denote 17-year-olds have serum cholesterol values.
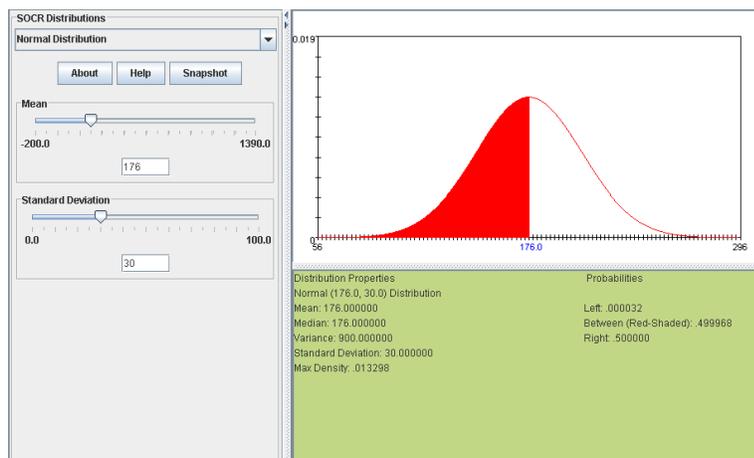
(a) P(Y<=176) = 0.5
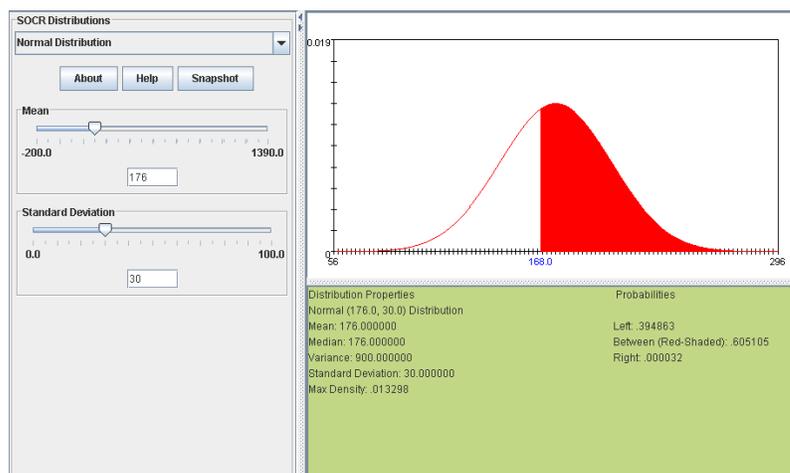
(b) P(Y>=168) = 0.605138
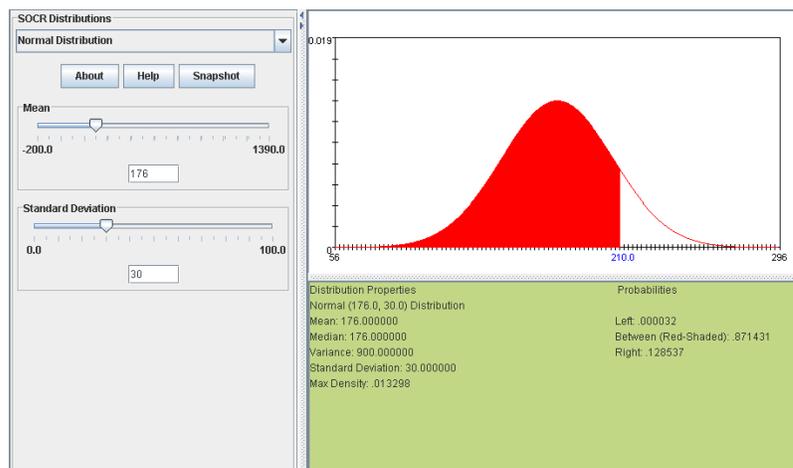
(c) P(Y<=210) = 0.871463
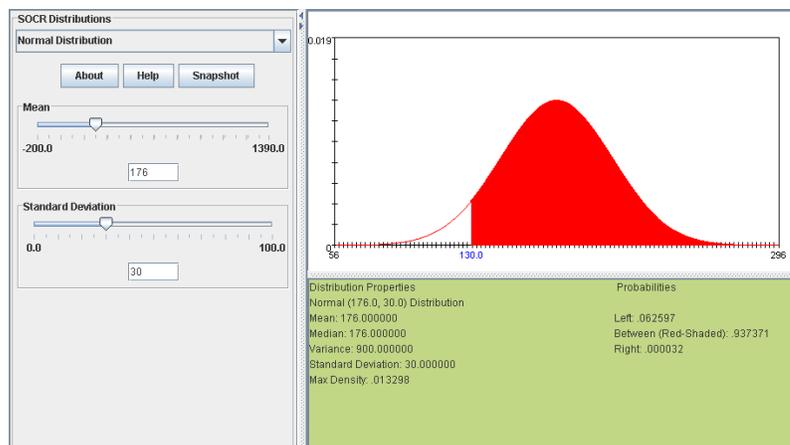
(d) P(Y>=130) = 0.937403
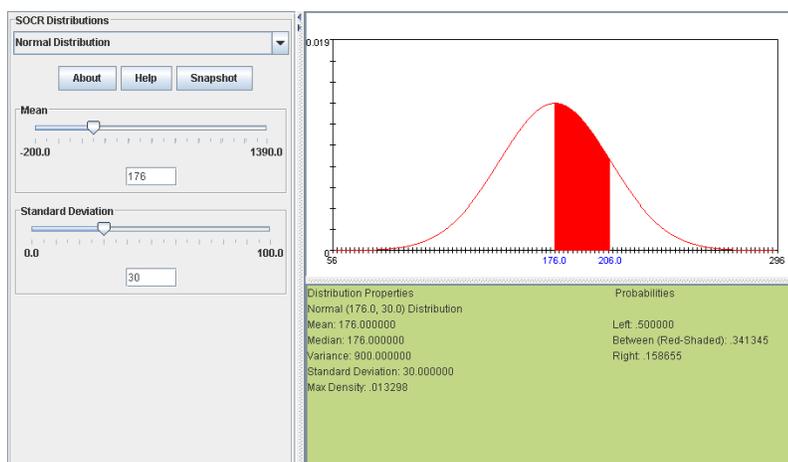
(e) P(176 <= Y <=206) = 0.341345
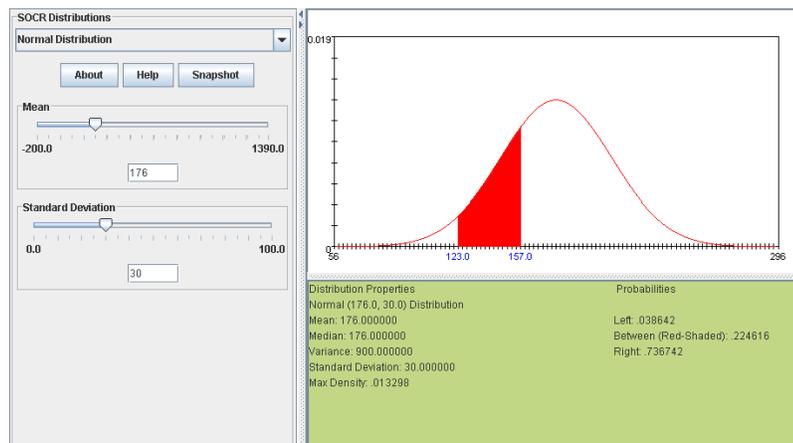
(f) P(123 <= Y <=157) = 0.224616

4
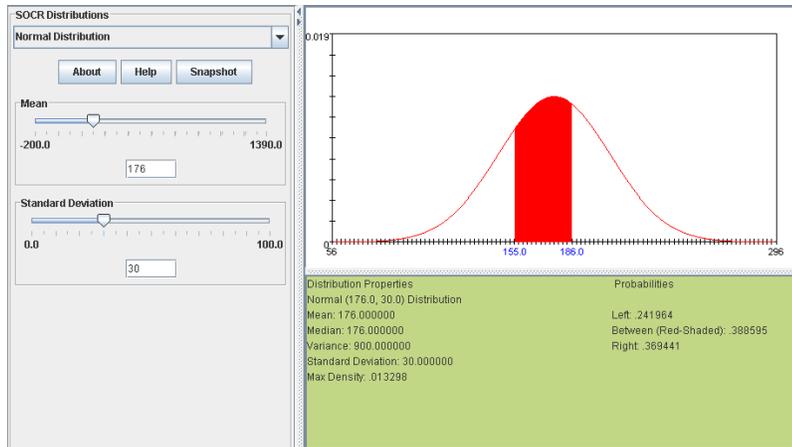
(g) P(155 <= Y <=186) = 0.388595

HW 4.3
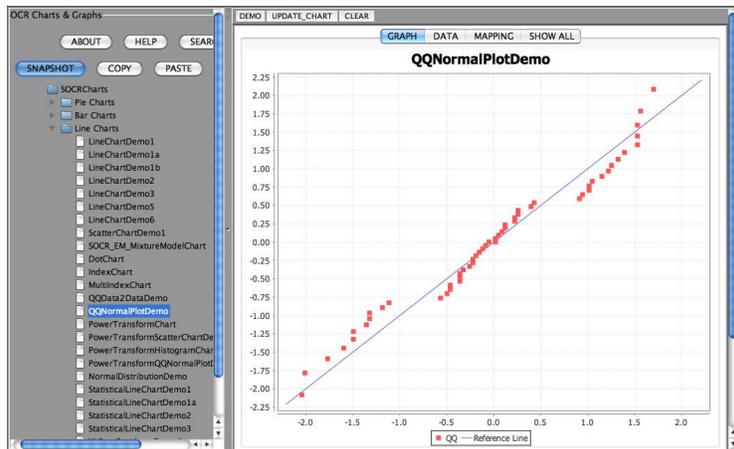
(a) Normal probability plot for "*calories*"

We observe some waves along the line, which is not strong evidence that the "calories" are normally distributed.
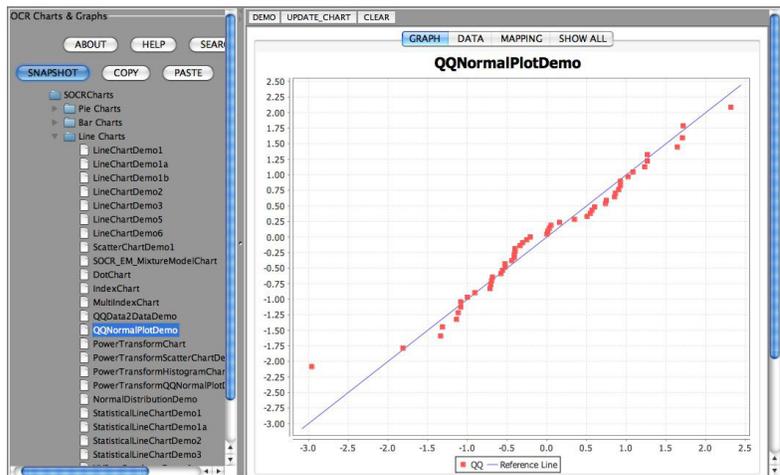
(b) Normal probability plot for "*sodium*"

Compared to the normal probability plot of "calories", this plot, from "sodium" data, suggests that the data

fairly follows the normal distribution, since the data points are mostly on the straight line.
HW 4.4
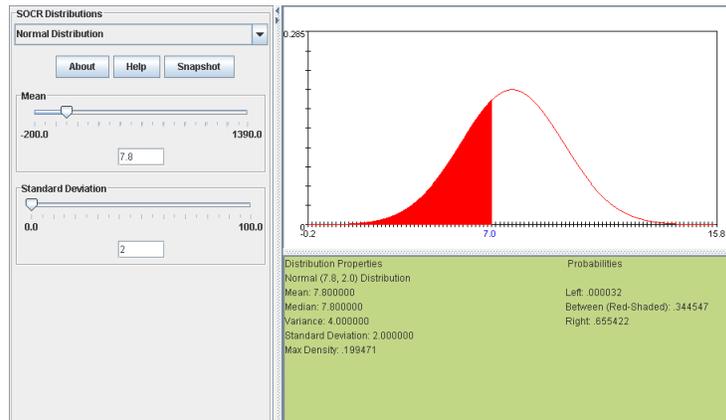
(a) P(Y <= 7) = 0.344579
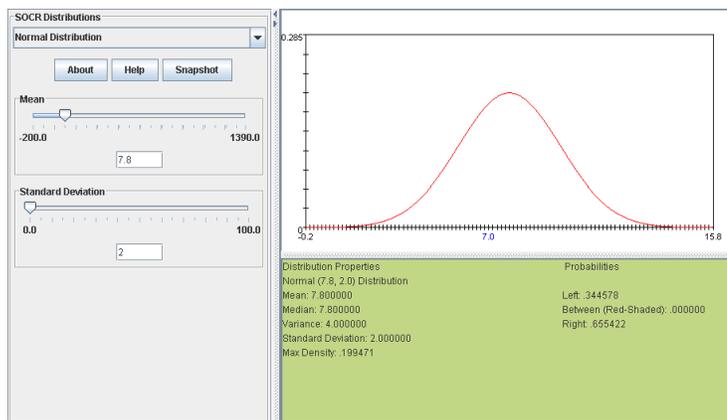
(b) P(Y = 7) = 0
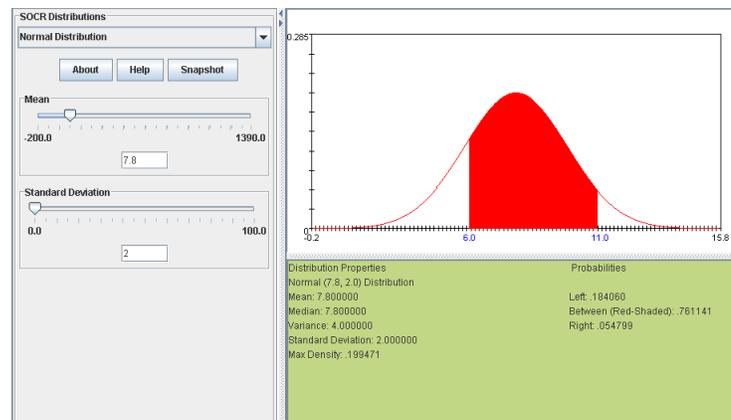

(c) P(6 <= Y <= 11) = 0.761141

HW 4.5

Let X denote the number of fish with haplotype A, and Y denote the number of fish with haplotype B. Also, let p be a probability of fish with haplotype A.

n= 400
p = 0.3

Y = 400 - X
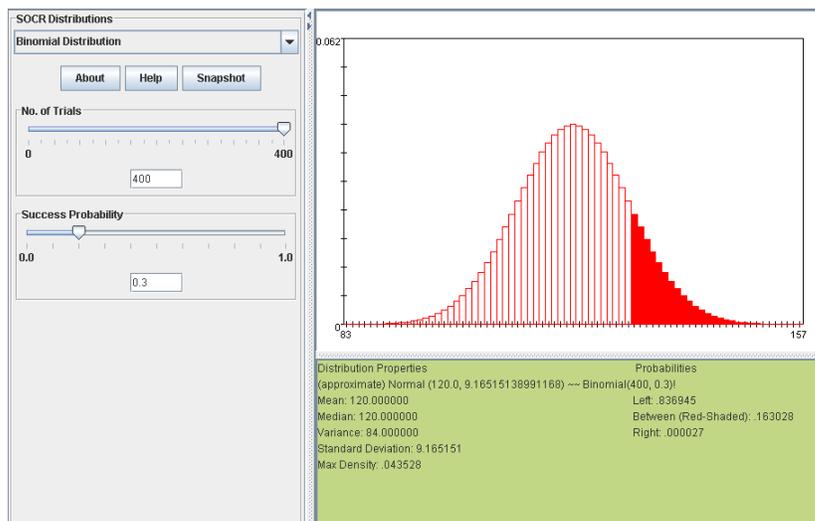
(a) P(X >= 130) = 0.163055
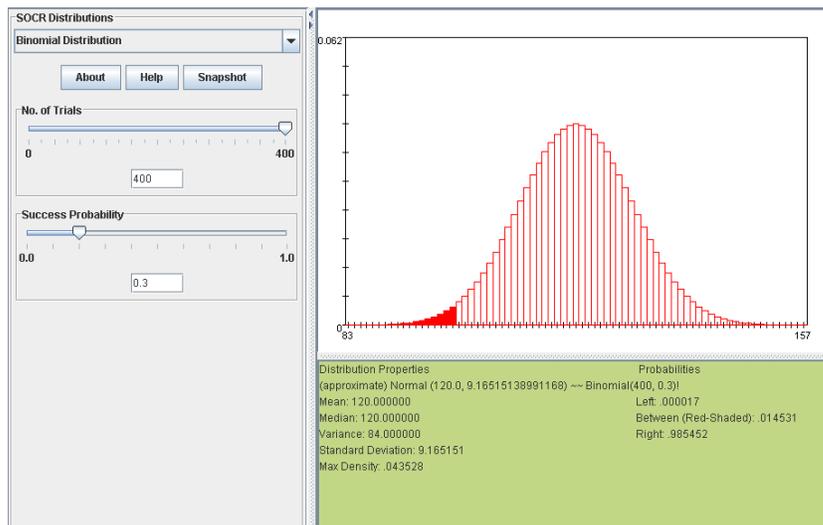
(b) P(Y >= 300) = P(X <= 100) = 0.014548

7
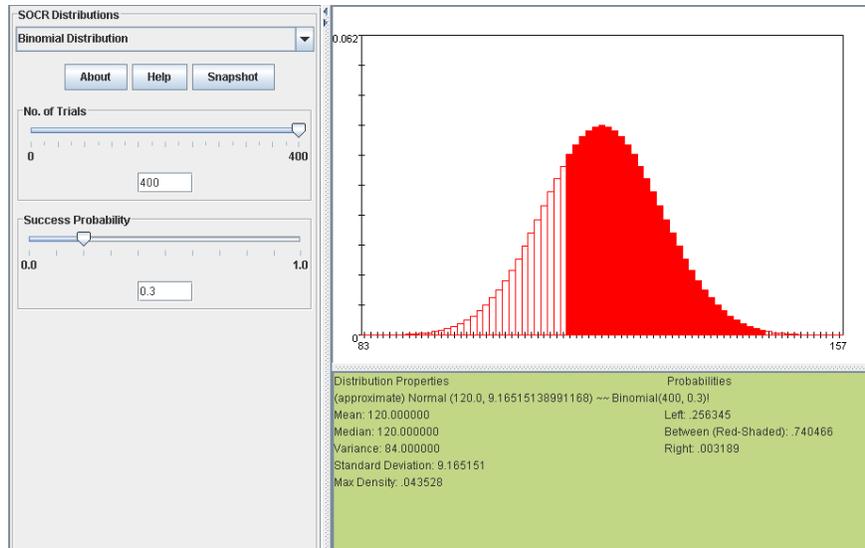
(c) P(115 <= X <= 145) = 0.740466
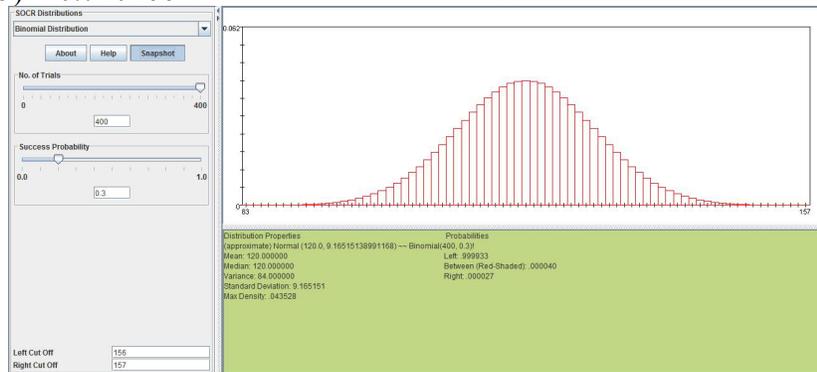
(d) P(X >= 160) ≈ 0

(e) Simulate these experiments using the SOCR Binomial Coin Experiment. Compare your exact calculations with the results of your simulations.
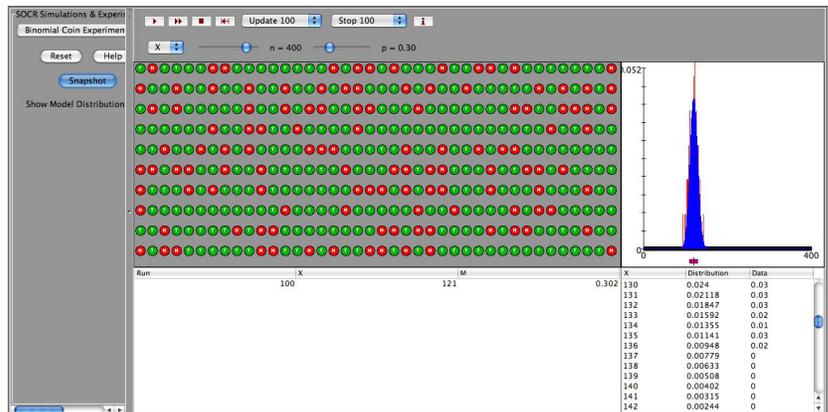

Let "Head" in coin indicate "haplotype A"

(a) P(X >= 130) = 0.17
(b) P(Y >= 300) = P(X <= 100) = 0.01
(c) P(115 <= X <= 145) = 0.61
(d) P(X >= 160) = 0

The empirical results are quite close to the exact calculations.

HW 4.6
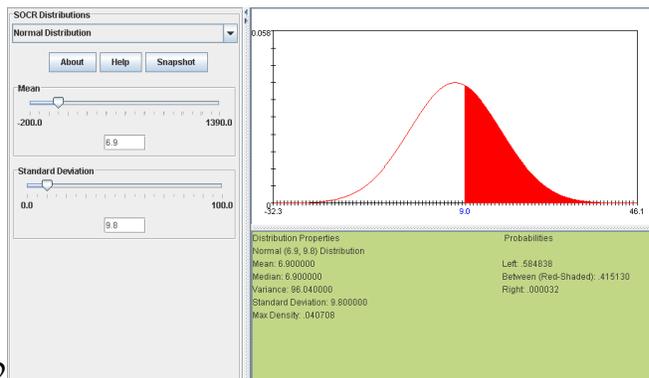
(a) $P(Y > 9) = 0.415162$
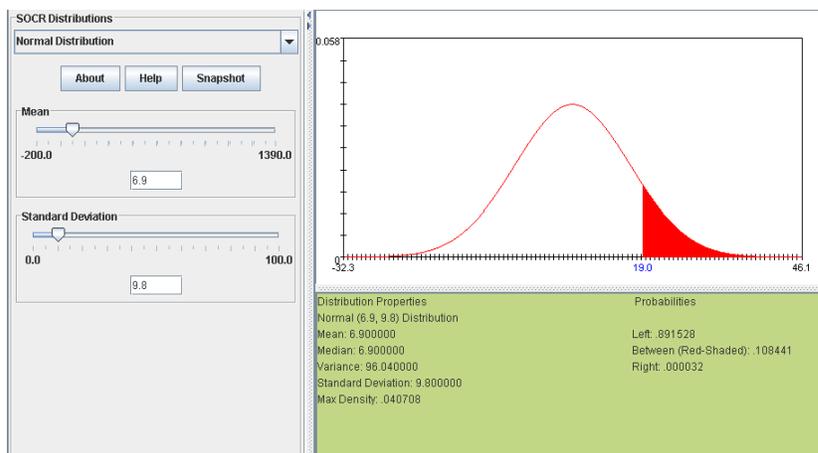
(b) $P(Y > 19) = 0.108473$

(c) $P(6 < Y < 14) = 0.302204$