FIFTH LECTURE SUMMARY

THE SAMPLING DISTRIBUTION OF $\bar{x}$ IS (WHEN $n > 30$) ALMOST PERFECTLY NORMAL.

ITS MEAN IS THE SAME AS THE POPULATION MEAN, ITS STANDARD DEVIATION (ALSO CALLED STANDARD ERROR) EQUALS THE POPULATION'S F DIVIDED BY $\sqrt{n}$.

THIS IMPLIES THAT $\frac{\bar{x}-\mu}{\sigma/\sqrt{n}}$ HAS THE STANDARD NORMAL DISTRIBUTION *Z*.

WHEN THE POPULATION ITSELF IS NORMAL, THE PREVIOUS STATEMENT IS TRUE AND EXACT FOR ANY *n*.

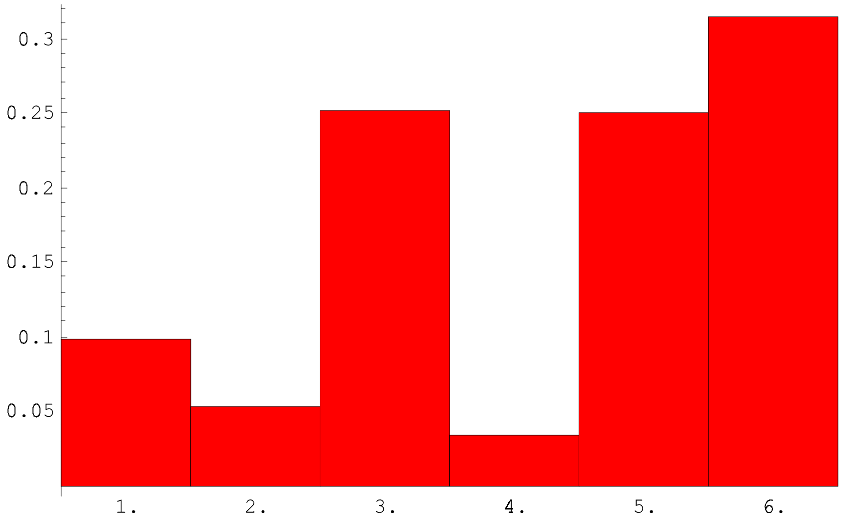
WE CAN THUS ANSWER ALL SORTS OF PROBABILITY QUESTIONS ABOUT $\bar{x}$ (OR, EQUIVALENTLY, THE SAMPLE TOTAL), AS

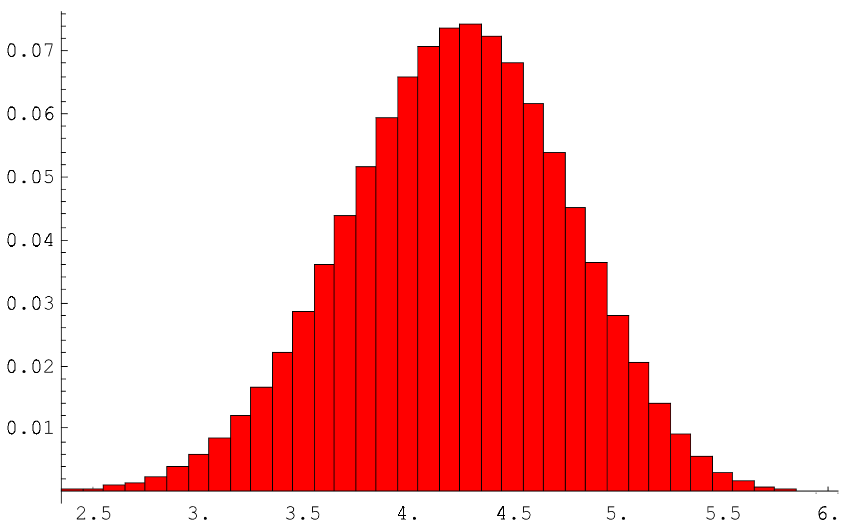
LONG AS WE ARE GIVEN (OR CAN COMPUTE) THE POPULATION'S : AND F.

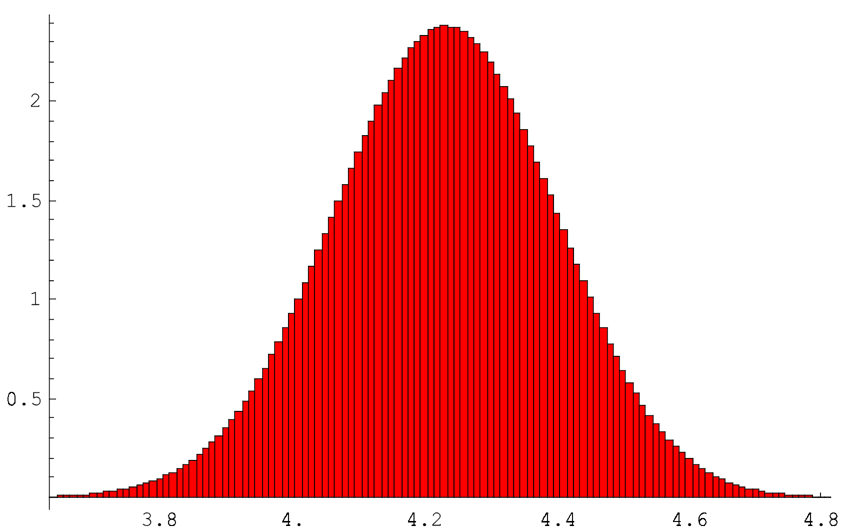
IN SUBSEQUENT CHAPTERS, WE WILL ALSO NEED:

WHEN n > 30, WE CAN REPLACE F BY *s*, AND STILL CLAIM THAT $\frac{\bar{x}-\mu}{s/\sqrt{n}}$ HAS THE STANDARD NORMAL DISTRIBUTION *Z*.

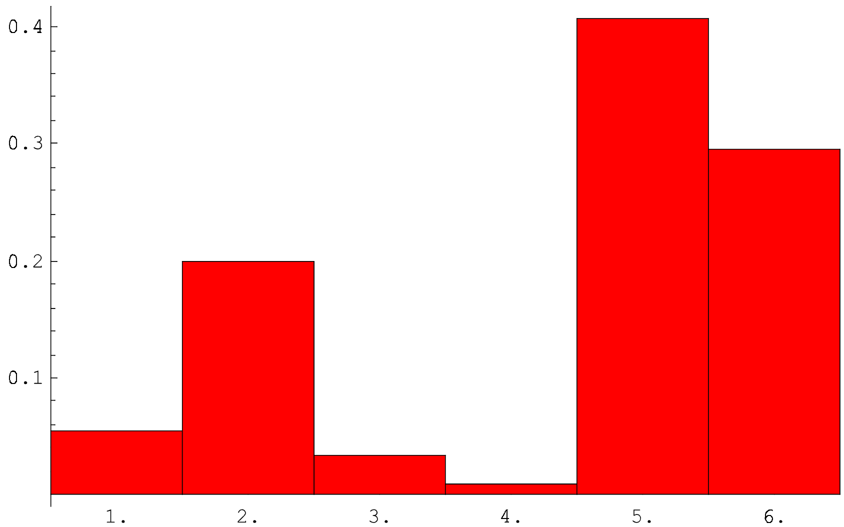
EXAMPLE OF THE ‘LAW OF AVERAGES’

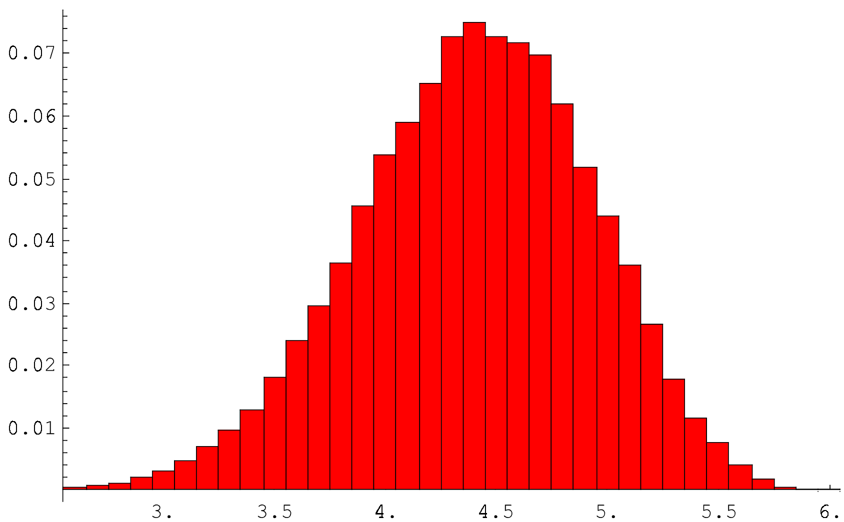


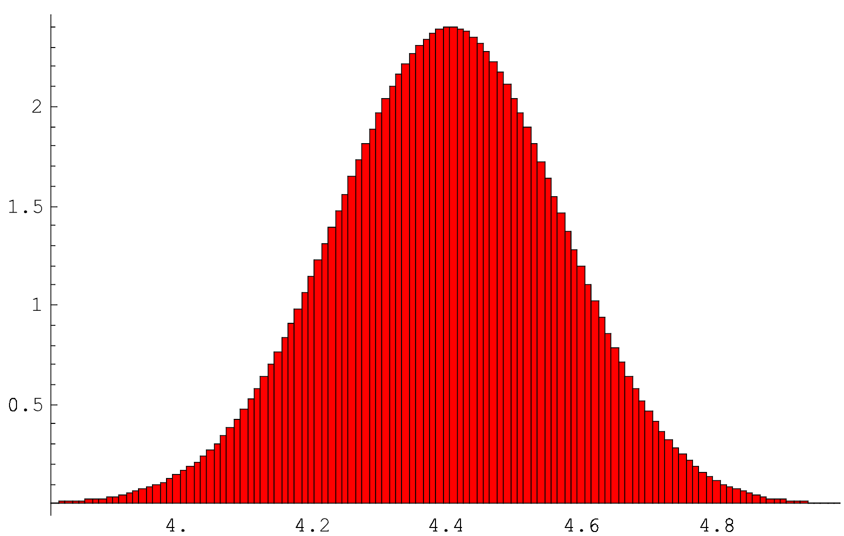


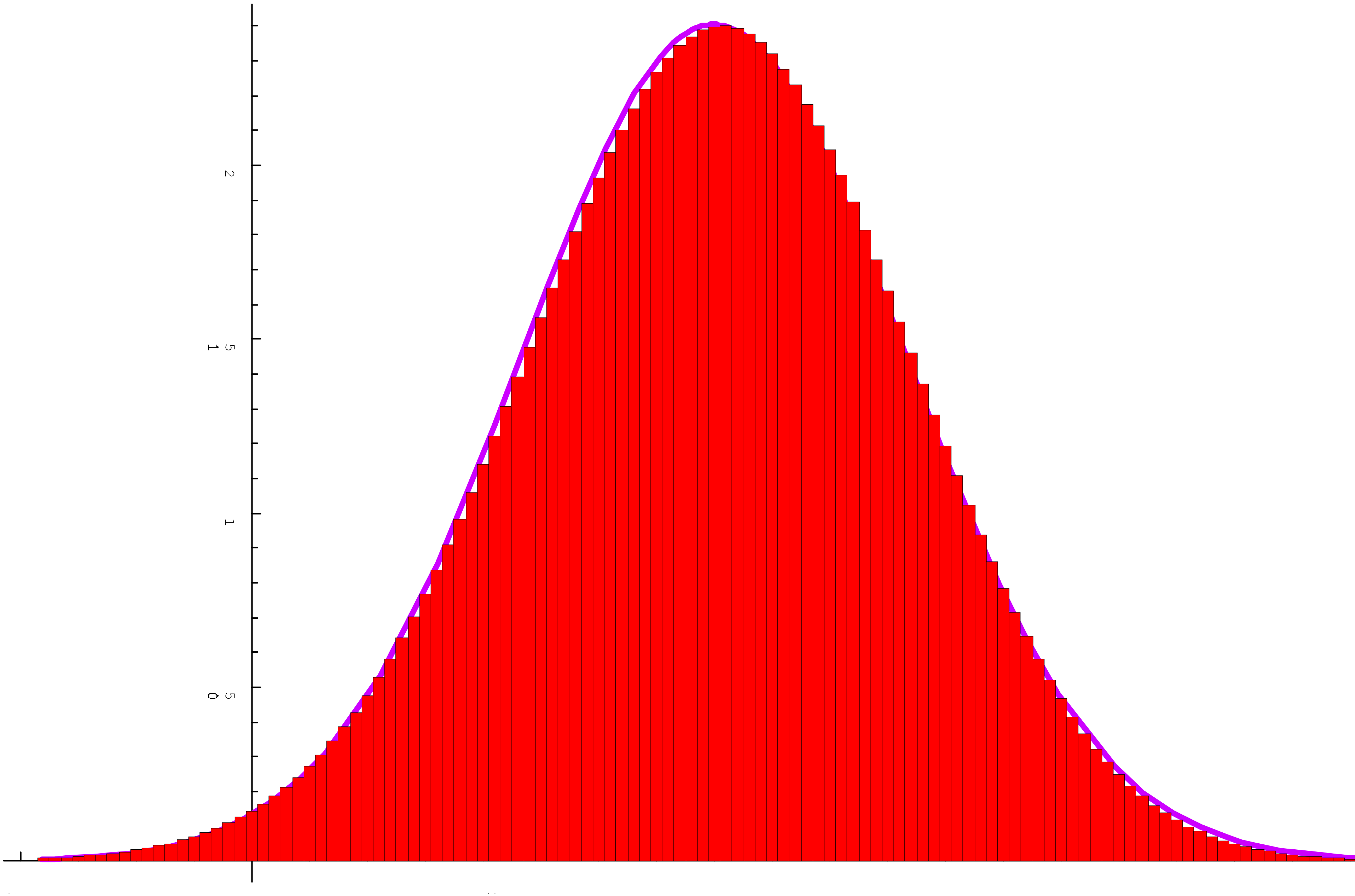


ANOTHER EXAMPLE








2
1.5
1
0.5