Hypothesis testing

Output:
Shaded area denotes the CDF of the binomial between 550 and 555.
Equivalent area under normal density function - notice that what is extra on the left side (above binom curve) compensates for what is cut off on the right side of each bar (because normal density is below the binom curve on the right side):
Power curve - shows that power $(1 - \beta)$, is higher at higher values of $p$, which means the probability of false negatives is lower.
Sample size: Suppose we want to test $H_0: p=20/38$ versus $H_a: p>20/38$ at $\alpha=0.05$. What size sample do we need to have a power of 0.9 when $p=0.55$? Answer: 3900

Notes:
1. Hypothesis testing for 4 parameters: prop.test, t.test, summary output from linear regressions, cor.test
2. Bases for these tests:
   - prop.test: normal approximation for binomial when $np > 10$ and $n(1-p) > 10$
   - t.test: CLT - approximate sampling distribution of sample mean with normal distribution
   - summary output of lm - running t.test with the assumption that the regression coefficients are normal