POWER EXAMPLES

1) Single sample *t*-test (assume variance is known) – you can do this in the applet, or Stata, or both

H$_0$:	H$_1$:	σ	α	n	1-sided or 2	Power	Pr(Type II error)
μ=100	μ=105	15	0.05	25	1-sided +		
μ=100	μ=105	15	0.05	35	1-sided +		
μ=100	μ=105	15	0.05	50	1-sided +		
μ=100	μ=105	15	0.05	50	2-sided		
μ=100	μ=110	15	0.05	25	1-sided +		
μ=100	μ=110	15	0.05	35	1-sided +		
μ=100	μ=110	15	0.05	50	1-sided +		
μ=100	μ=110	15	0.05	50	1-sided -		
μ=100	μ=103	15	0.05	20	1-sided +		
μ=100	μ=103	15	0.05	40	1-sided +		
μ=100	μ=103	15	0.05	60	1-sided +		
μ=100	μ=103	15	0.05	80	1-sided +		
μ=100	μ=103	15	0.05	160	1-sided +		

2) Single sample *t*-test (assume variance is known) minimum required sample size – use Stata's power calculator

H$_0$:	H$_1$:	σ	α	n	1-sided or 2	Power	Pr(Type II error)
μ=100	μ=105	15	0.05		1-sided +	0.80	0.20
μ=100	μ=105	15	0.05		1-sided +	0.90	0.10
μ=100	μ=107	15	0.05		1-sided +	0.80	0.20
μ=100	μ=103	15	0.05		1-sided +	0.80	0.20
μ=100	μ=105	20	0.05		1-sided +	0.80	0.20
μ=100	μ=105	20	0.05		1-sided +	0.90	0.10

3) Single sample *t*-test (assume variance is known) minimum detectable effect size – use Stata's power calculator

H₀:	H₁:	σ	α	n	1-sided or 2	Power	Pr(Type II error)
μ=100		15	0.05	25	1-sided +	0.80	0.20
μ=100		15	0.05	35	1-sided +	0.90	0.10
μ=100		15	0.05	50	1-sided +	0.80	0.20
μ=100		15	0.05	50	2-sided	0.80	0.20

4) NY voucher data
   a. Open the dataset on Github called nyvoucher.dta
   b. Conduct a *t*-test for the difference in mean post-test score (voucher recipients vs. non-voucher recipients).
   c. Do the same thing using regression with a single regressor.
   d. Now add the pre-test score as a covariate to the regression in (c). How does the coefficient compare? How does the standard error compare?
   e. How (qualitatively) does statistical power compare in the part (d) regression as compared to the part (c) regression?