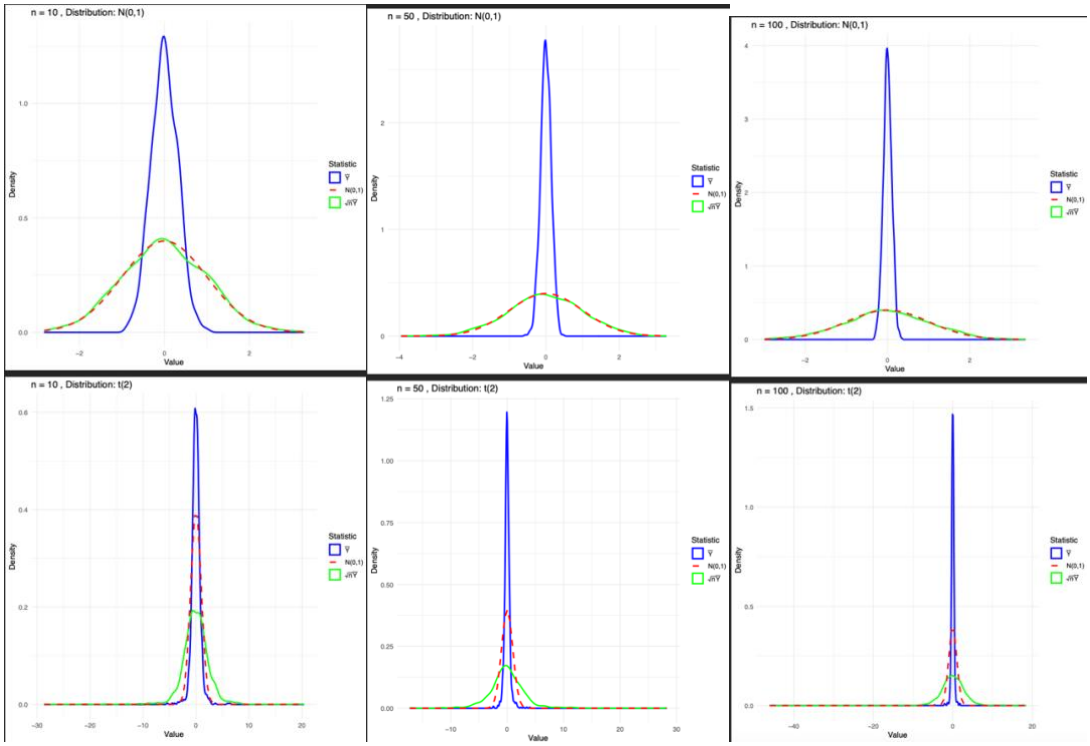
Q1



For Normal distribution, it is obvious that $\sqrt{n}\,Y$ will converge to normal distribution, but Y bar will result in lower variance, which will converge to 0 when n close to infinite.

For t(2), since the variance of t(2) doesn't exist, CLT cannot be directly applied. In practice, t(2) will not converge to any specific distribution when sample size is large. But we can still observe Y bar will converge to single number since its variance will converge to 0 when n close to infinite.

Q2.

(a)

	Estimate	Std. Error	t value	Pr(>|t|)
xones	0.215519353	0.061958219	3.4784627	0.0005490618
xdfy	-1.167618067	0.927018939	-1.2595407	0.2084322820
xinfl	-0.379379508	0.642884239	-0.5901210	0.5553804406
xsvar	-0.101604035	0.393862529	-0.2579683	0.7965392642
xtms	-0.329207402	0.206163991	-1.5968230	0.1109472182
xtbl	-0.317573893	0.113024303	-2.8097841	0.0051549300
xdfr	0.275242786	0.148556414	1.8527829	0.0645120943
xdp	0.045320259	0.012360937	3.6664096	0.0002727608
xltr	0.126357857	0.073946585	1.7087720	0.0881238502
xep	-0.002077709	0.008739102	-0.2377485	0.8121751096
xbmr	0.028790417	0.032257027	0.8925316	0.3725443638

For alpha = 0.05, xdp, xtbl and intecept is rejected

(b)

```
Linear hypothesis test

Hypothesis:
xones = 0
xdfy  + xinfl = 0

Model 1: restricted model
Model 2: y ~ (x - 1)

  Res.Df     RSS Df Sum of Sq  Chisq Pr(>Chisq)
1    494 0.97081
2    492 0.93777  2  0.033039 17.334  0.0001722 ***
```

P-value is smaller than 5 %, meaning the hypothesis is rejected. The result is aligned with (a) since intercept = 0 is reject in single wald test. If we set only dfy and infl to 0. Wald test cannot reject the hypothesis.

Code can be found on https://github.com/YuJu0819/quant-method in folder hw6