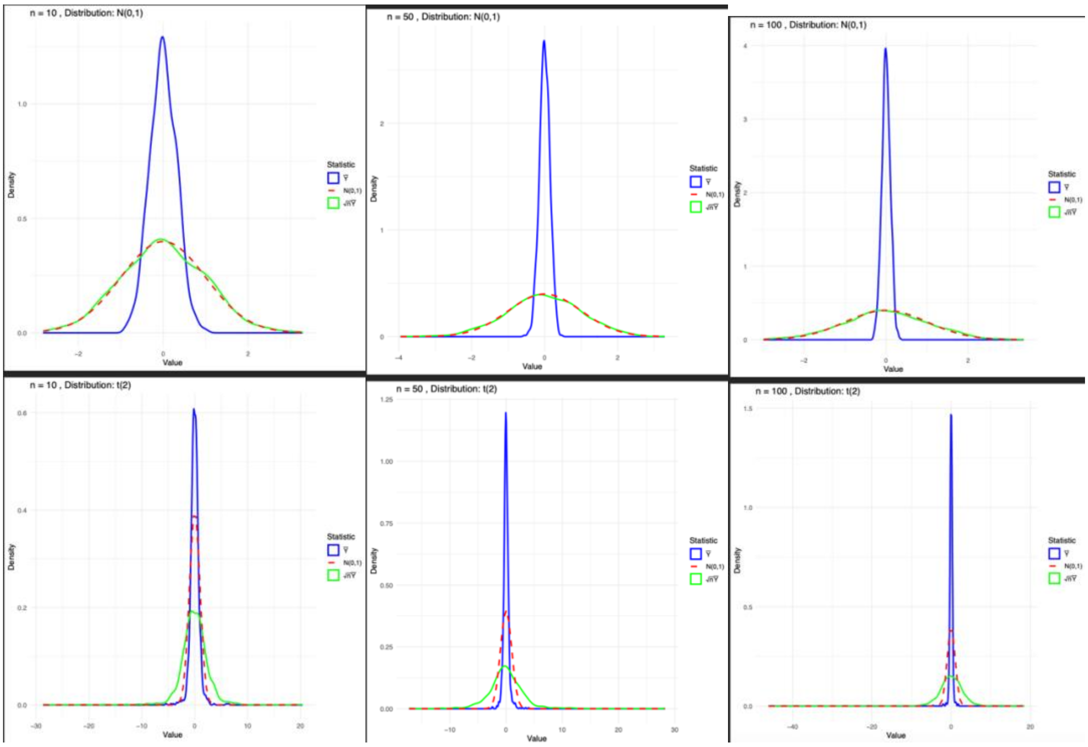
Q1




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), it's variance lies between $\sqrt{n}\,Y$ and Y bar. As n becomes larger, $\sqrt{n}\,Y$ will still different from t(2) since it is sharper than normal distribution.

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](https://github.com/YuJu0819/quant-method) in folder hw6