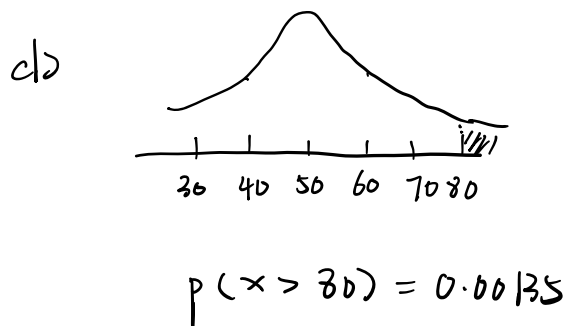
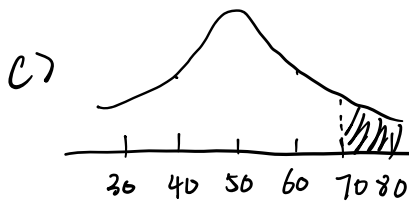
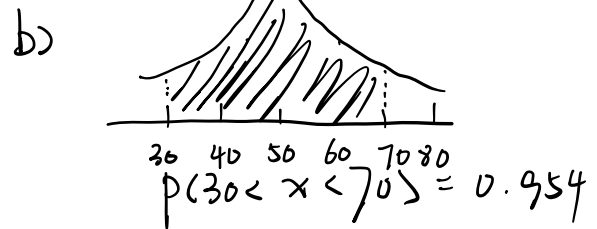
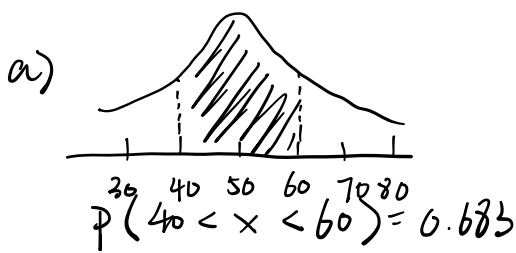


1.



Simon

2. a)  $n=10$ ,  $\bar{y}=52$ ,  $S^2=25$ ,  $S=5$

$$S_{\bar{y}} = \frac{S}{\sqrt{n}} = \frac{5}{\sqrt{10}} = 1.5811$$

b)  $H_0: \mu = 50$

$H_1: \mu \neq 50$

$$t = \frac{\bar{y} - \mu}{\frac{S}{\sqrt{n}}} = \frac{52 - 50}{\frac{5}{\sqrt{10}}} = 1.2649$$

The critical value of  $t$  at 5% level of freedom of 9 is 2.262.  $t < 2.262$ .

So  $H_0$  cannot be rejected, so the  $\mu = 50$ .

c)  $CI = (\bar{y} \pm t_{\text{value}} \frac{S}{\sqrt{n}}) = (52 - 2.262 \frac{5}{\sqrt{10}}, 52 + 2.262 \frac{5}{\sqrt{10}})$   
 $= 52 \pm 3.57$

The confidence interval will include the true mean value, so null hypothesis can't be rejected.

3.  $n=100, \bar{y}=52, s^2=25, s=5$

a)  $s_{\bar{y}} = \frac{s}{\sqrt{n}} = \frac{5}{10} = 0.5$

b)  $H_0: \mu = 50 \quad t = \frac{\bar{y} - \mu}{0.5} = 4$   
 $H_1: \mu \neq 50$

The critical value of  $t$  at 5% level of freedom of 99 is 1.984.  $t > 1.984$

So  $H_0$  is rejected so  $\mu \neq 50$

c) The result differs because the two different sample size.  
 Type II error fails to reject  $H_0$  when  $H_1$  true.

4. a) - normal distribution

- Sample mean is unbiased. because it is close to population mean.

- Sample mean is narrow.

-  $P(\bar{x} > 9) = 0.0023$

- P value is the possibility of rejecting null hypothesis.  
 0.0023 of repeated samples.

b) - Similar, both normal distribution

sample mean and population mean close to 0.

SE is smaller in sample of 100 because different size.

-  $P(\bar{x} > 3) = 1 - 0.9987 = 0.0013$ .  $P(\bar{x} > 6) = 0$ .  
 $Z_3 = 3$   $Z_6 = 6$ .

c) No, I don't believe population mean is 0.

The sample mean is an unbiased estimator of population mean.

5. a) not normal, because it only has left side  
 b) no  
 c) no  
 d) no  
 e) no  
 f) yes  
 g) When the sample mean approaches to a normal distribution, the sample size is also getting larger.

6. a) 9  
 b) 51

- 7.
- |             | percentTaking  | satMath          |
|-------------|----------------|------------------|
| a) mean     | 35.49          | 529.27           |
| b) variance | 690.975        | 1213.443         |
| c) SE       | 3.681          | 4.879            |
| d) 95% CI   | (28.10, 42.88) | (519.48, 539.07) |
- e) It is different because 95% CI doesn't have 0.  
 f) They are not normally distributed.  
 but it will not affect the CI.