

給定一組資料如下，並令 $\alpha = 0.05$ ，試問下組資料是否常態分配

4.9 5.06 5.09 5.08 5.15 5.17 5.18 5.19 5.24 5.25
 5.25 5.25 5.25 5.27 5.27 5.27 5.28 5.28 5.28
 5.29 5.30 5.30 5.30 5.30 5.31 5.31 5.31 5.31 5.31
 5.32 5.32 5.33 5.34 5.35 5.35 5.35 5.36 5.37

$H_0 = X \sim N(\mu, \sigma^2)$

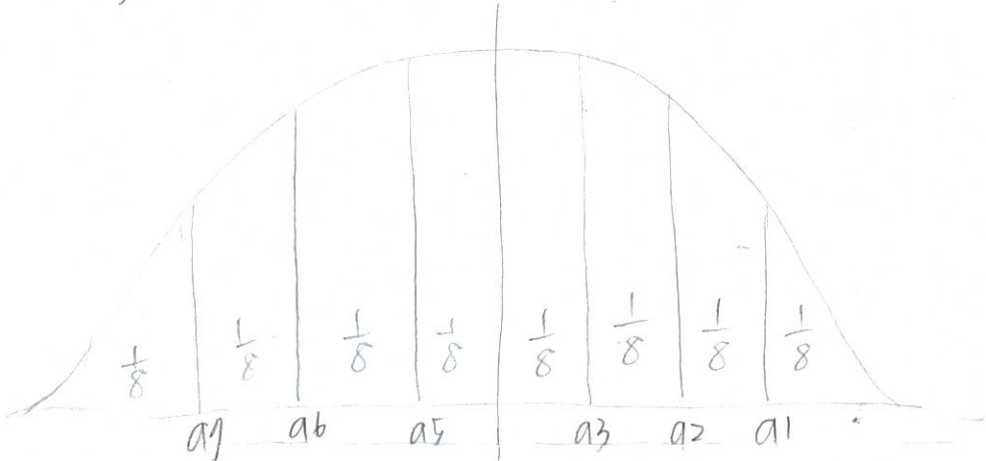
$H_1 = X \not\sim N(\mu, \sigma^2)$

$\bar{x} = \frac{4.9 + 5.06 + \dots + 5.37}{39} = 5.258718 \approx 5.2587$

$\gamma = 0$
 \uparrow

$s^2 = \frac{4.9^2 + 5.06^2 + \dots + 5.37^2 - 39 \times 5.2587^2}{39-1} = \frac{1078.867 - 1078.51}{38} = 0.009385$ $\Rightarrow s = \sqrt{s^2} = 0.0969$

$k=8$



a_4
 期望值 = $\bar{x} = 5.2587$ #

$P(X > a_2) = \frac{2}{8} = 0.25$
 $\Rightarrow P(Z > \frac{a_2 - 5.2587}{0.0969}) = 0.25$

$P(X > a_3) = \frac{2}{8} = 0.375$
 $\Rightarrow P(Z > \frac{a_3 - 5.2587}{0.0969}) = 0.375$

$\Rightarrow P(Z > 0.675) = 0.25$

$\Rightarrow P(Z > 0.32) = 0.375$

$P(X > a_1) = \frac{1}{8} = 0.125$
 $\Rightarrow P(Z > \frac{a_1 - 5.2587}{0.0969}) = 0.125$

$\Rightarrow P(Z > 1.15) = 0.125$

$\frac{a_1 - 5.2587}{0.0969} = 1.15 \Rightarrow a_1 = 5.3701$ #

$\frac{a_2 - 5.2587}{0.0969} = 0.675 \Rightarrow a_2 = 5.3241$ #

$\frac{a_3 - 5.2587}{0.0969} = 0.32 \Rightarrow a_3 = 5.28$

$a_5 = 2a_4 - a_3 = 10.5174 - 5.2899 = 5.2275$ #

$a_6 = 2a_4 - a_2 = 10.5174 - 5.3241 = 5.1933$ #

$a_7 = 2a_4 - a_1 = 10.5174 - 5.3701 = 5.1473$ #

分組	o_i	$e_i = np_i = 39 \times \frac{1}{8}$	$(o_i - e_i)^2$
5.3201 以上	0	4.875	≥ 3.7656
5.3241 ~ 5.3201	正 T 1	4.875	4.5156
5.2897 ~ 5.3241	正 T 12	4.875	50.7656
5.2587 ~ 5.2897	正 T 7	4.875	4.5156
5.2277 ~ 5.2587	正 5	4.875	0.0156
5.1933 ~ 5.2277	0	4.875	≥ 3.7656
5.1473 ~ 5.1933	正 4	4.875	0.7656
5.1473 以下	正 4	4.875	0.7656

拒絕 H_0 若 $\sum_{i=1}^k \frac{(o_i - e_i)^2}{e_i} > \chi_{\alpha}^2 (k-1-r) = \chi_{0.05}^2 (7) = 14.07$

$$\frac{\geq 3.7656 + 4.5156 + \dots + 0.7656}{4.875}$$

$$= \frac{108.8748}{4.875} = 22.3333$$

∴ 在 $\alpha = 0.05$ 下，拒絕 H_0 ，由資料顯示，此組數據非常態分配 #