Ex 1 (sample)

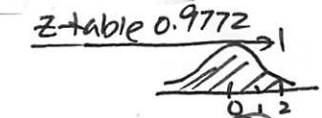
1. population (universe) (B)
2. Countable value ——— Discrete (A)
3. ordered value. Ordinal (D)
4. Total number of obs: 25; 80 or above: 1 % Freq: $\frac{1}{25}\times 100\% = 4\%$ (D)
5. $P(A)=0.9$, $P(B)=0.7$, $P(A\cap B)=P(A)P(B)$ (Independent events)
   $=0.9\times 0.7=0.63$ (C)
6. Empirical Rule: 99.7% of the obs. will be contained within 3σ about μ (A)
7. Binomial Distribution: $b(n=6, p=0.5)$
   "At least 1" $P(X\geq 1)=1-P(x=0)=1-\frac{6!}{0!(6-0)!}\times 0.5^0\times(1-0.5)^6$
   $=0.984$ (B)
8. Binomial Distribution: $b(n=8, p=0.5)$ mean $\mu=n\times p=0.5\times 8=4$ (C)
9. mean $\bar{x}=\frac{\sum x_i}{n}=\frac{7+4+9+0+7+3}{6}=5$ (9B)
10. mode: 7 (A)
11. standard deviation $S=\sqrt{Var}=\sqrt{\frac{\sum(x_i-\bar{x})^2}{n-1}}$
    $=\sqrt{\frac{54}{5}}=3.29$ (C)

obs	$(x_i-\bar{x})^2$
7	$(7-5)^2=4$
4	$(4-5)^2=1$
9	$(9-5)^2=16$
0	$(0-5)^2=25$
7	$(7-5)^2=4$
3	$(3-5)^2=4$
	$\Sigma=54$

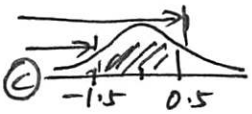
12. Step 1 order the data.
    0, 3, 4, 7, 7, 9
    r_1 r_2 r_3 r_4 r_5 r_6

For Q_1: $L_{Q_1}=\frac{25}{100}(6+1)=1.75\Rightarrow k=1, d=0.75$
$Q_1=r_1+0.75(r_2-r_1)=0+0.75*3=2.25$
For Q_2: $L_{Q_2}=\frac{50}{100}(6+1)=3.5\Rightarrow k=3, d=0.5$ $Q_2=r_3+0.5[r_4-r_3]=5.5$
For Q_3: $L_{Q_3}=\frac{75}{100}(6+1)=5.25\Rightarrow k=5, d=0.25$ $Q_3=r_5+0.25[r_6-r_5]=7.5$
12 (A) 13. (D)
5 # summary: 0, 2.25, 5.5, 7.5, 9 Left-Skewed
(2.25 ↑ 5.5 ↑ 3.5; 1.5 ↑)

14. Between 10 and 20: 20% (D)
15. Below 60 (Left-tail): 90% (A)



16-18 $X: N(\mu=150, \sigma=10)$
16. Find $P(X<170)=P\left(\frac{x-\mu}{\sigma}<\frac{170-150}{10}\right)=P(z<2)=0.9772$ (D)
17. Find $P(135<x<155)=P\left(\frac{135-150}{10}<\frac{x-\mu}{\sigma}<\frac{155-150}{10}\right)$
$=P(-1.5<z<0.5)=0.6915-0.0668=0.6247$ (C)



18. Right-tail prob = 0.123
step 1 $1-0.123=0.877\Rightarrow z=1.16$
step 2 $1.16=\frac{x-150}{10}\Rightarrow x=10\times 1.16+150=161.6$ (A)

19-20 $P(\text{Yes}\cup 2\text{cars})=P(\text{Yes})+P(2\text{cars})-P(\text{Yes}\cap 2\text{cars})$
$=\frac{170}{400}+\frac{275}{400}-\frac{100}{400}=\frac{345}{400}$ (C)
20. $P(\text{NO}\mid 3\text{cars})=\frac{P(\text{NO}\cap 3\text{cars})}{P(3\text{cars})}=\frac{301400}{501400}=\frac{30}{50}$ (D)

21-23
21. $P(X\geq 2)=P(X=2)+P(X=3)+P(X=4)=0.6$ (21B)

22

x	f(x)	x f(x)
~~0~~	0.1	$0\times 0.1=0$
1	0.3	$1\times 0.3=0.3$
2	0.3	$2\times 0.3=0.6$
3	0.1	$3\times 0.1=0.3$
4	0.2	$4\times 0.2=0.8$

$\mu=\Sigma x f(x)=2$ (C)

23

x	f(x)	$(x-\mu)^2 f(x)$
0	0.1	$(0-2)^2\times 0.1=0.4$
1	0.3	$(1-2)^2\times 0.3=0.3$
2	0.3	$(2-2)^2\times 0.3=0$
3	0.1	$(3-2)^2\times 0.1=0.1$
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$\sigma^2=\Sigma=1.6$
$\sigma=\sqrt{1.6}=1.27$ (B)

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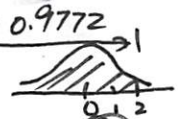

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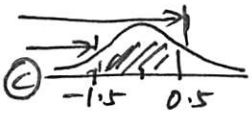

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