

Q1: (Very similar to Ex 1.3.1, p12).
5 summary

§1.3. Data Summaries. (P7)

Defn 4. 5 # summary (P12).

$y_{(1)}$ $q(0.25)$ $q(0.5)$ $q(0.75)$ $y_{(n)}$
min 25% quantile median 50% quantile max.
percentile percentile

procedure

1. sort data.

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
0	0.4	0.4	0.6	0.8	1.0	1.0	1.2	1.6	1.6
⑪	⑬	⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳
1.6	2.2	2.6	3.0	3.8	4.2	4.2	4.4	5.2	6.0

$n=20$

(i) 2. ~~calculate~~ ~~stats~~. We automatically get 2 #'s out of the 5.
 $y_{(1)} = \min = 0$
 $y_{(n)} = \max y_{(20)} = \max = 6.0$
min max

(ii) 3. Calculate other 3.

$(20+1)(0.25) = 5.25 \rightarrow$ look at the avg of 5th and 6th obs.
 $y_{(5)}$ $y_{(6)}$

$$\hookrightarrow \frac{1}{2}(0.8 + 1.0) = 0.9.$$

$(20+1)(0.5) = 10.5 \rightarrow$ 10th and 11th

$$\frac{1}{2}(y_{(10)} + y_{(11)}) = \frac{1}{2}(1.6 + 1.6) = 1.6$$

$(20+1)(0.75) = 15.75 \rightarrow$ 16th and 15th.

$$\frac{1}{2}(y_{(15)} + y_{(16)}) = \frac{3.8 + 4.2}{2} = 4.$$

IQR (Defn 3, P12)

$$q(0.75) - q(0.25) = 4 - 0.9 = 3.1$$

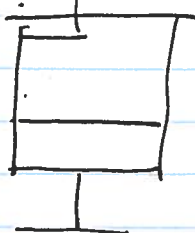
(iii) Boxplot. ~~Anything outside~~ $q(0.25) +$

4.

1.6

0.9

0

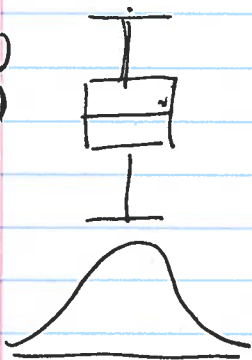


1) Middle 3 #'s $q(0.75)$ $q(0.5) = \text{median}$ $q(0.25)$

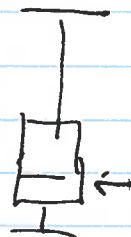
2) outliers (anything outside $q(0.25) - 1.5 \times \text{IQR}$ or $q(0.75) + 1.5 \times \text{IQR}$)
No. 8.65 6.25

(iv)
(pg)

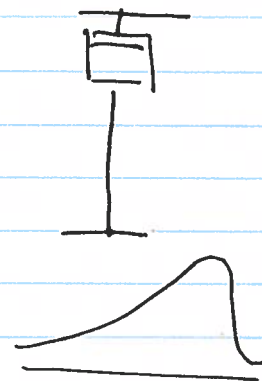
(roughly)
symmetric



symmetric/
bell-shaped
mean = median.



pos. skew.
⊕ skew
skew to the right.
~~skew to the left.~~
mean > median



⊖ skew
skew to the left.
median > mean.

Q2) → start with sorting the data.

zone A	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
zone A	6	6	7	7	8	8	10	11	13	14	15	15
zone B	-20	-18	-7	-4	-2	-1	0	0	2	4	5	7

(i) ① max/min

A

B

min = 6
max = 15

-20.
7.

② quantiles.

$$\begin{aligned}
 q(0.25) &= (0.25)(12+1) = 3.25 \rightarrow 3, 4 \\
 q(0.5) &= (0.5)(12+1) = 6.5 \rightarrow 6, 7 \\
 q(0.75) &= (0.75)(12+1) = 9.75 \rightarrow 9, 10.
 \end{aligned}$$

so	$q(0.25)$	7.	-5.5
	$q(0.5)$	9	-0.5
	$q(0.75)$	13.5	3.

	min	$q(0.25)$	$q(0.5) = \text{median}$	$q(0.75)$	max
so. z.A	6	7.	9	13.5	15
z.B	-20	-5.5	-0.5	3	7