Probability and Statistics-Solution Q1

Section A and B **SAMPLE-1**

Order the data values from smallest to largest:

31, 38, 39, 39, 42, 42, 45, 47, 48, 48, 48, 52, 52, 53, 54, 55, 57, 59, 60, 61, 64, 64, 66, 66, 67, 68, 68, 69, 71, 71, 74, 75, 77, 79, 79, 79

$M=Q_2=59.5,\quad Q_1=48\quad ,\quad Q_3=68.5$

The interquartile range IQR is the difference of the third and first quartile:

$$IQR=Q_3-Q_1=20.5$$

The five-number summary consists of the minimum, first quartile, median, third quartile and maximum.

Minimum: 31

Q_1: 48

M: 59.5

Q_3: 68.5

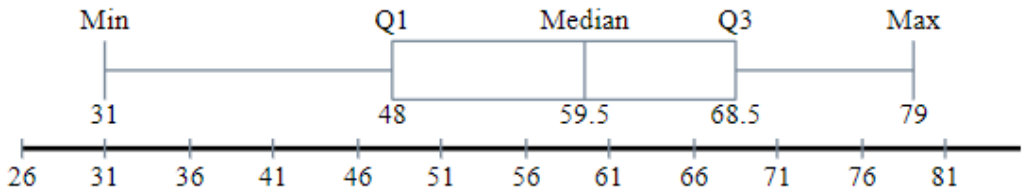
Maximum: 79

Outliers are observations that are more than upper and less than lower limit.

Upper limit $=Q_3+1.5IQR=68.5+1.5(20.5)=99.25$

Lower limit $=Q_1-1.5IQR=48-1.5(20.5)=17.25$

There are no outliers, because all data values in the sample are between 17.25 and 99.25.



Coefficient of variation = C.V(%) = (SD / Mean)100

Coefficient of skewness = (mean-mode)/SD = 3(mean-median)/SD

Probability and Statistics-Solution Q1

Section A and B **SAMPLE-2**

Sort the data set:

3.3,8.7,9.6,10.7,11.3,11.6,11.9,12.2,13.2,13.3,13.6,14.8,15,15.7,16.7

$IQR = Q_3 - Q_1 = 14.2 - 11.0 = 3.2$

The five-number summary is the minimum, first quartile, second quartile, third quartile and maximum:

Minimum: 3.3

Q_1: 11.0

Q_2: 12.2

Q_3: 14.2

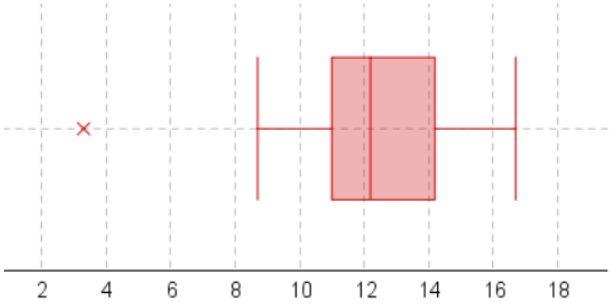
Maximum: 16.7

An outlier is more than 1.5 IQR's greater than Q3 or less than Q1.

Upper limit $= Q_3 + 1.5IQR = 14.2 + 1.5(3.2) = 19$ $Q_3 + 1.5IQR = 14.2 + 1.5(3.2) = 19$

Lower limit $= Q_1 - 1.5IQR = 11.0 - 1.5(3.2) = 6.2$ $Q_1 - 1.5IQR = 11.0 - 1.5(3.2) = 6.2$

Thus 3.3 is an outlier



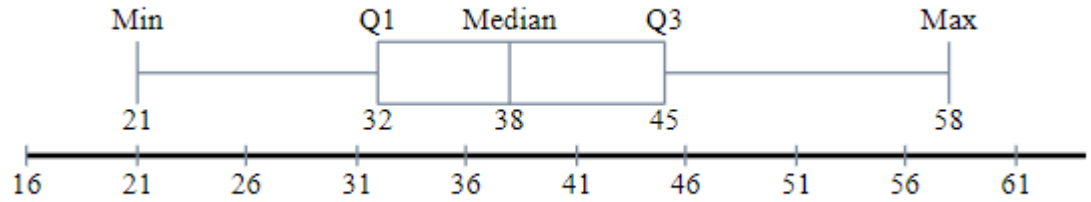
Coefficient of variation = C.V(%) = (SD / Mean)100

Coefficient of skewness = (mean-mode)/SD = 3(mean-median)/SD

Probability and Statistics-Solution Q1

Section C

Q1



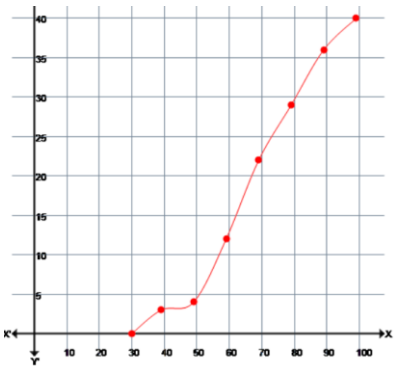
There is no outlier

Q2

$$\overline{x} = \frac{\sum xf}{n} = \frac{2720}{40} = 68$$

$x - \overline{x}$	$(x-\overline{x})^2$	$(x-\overline{x})^2 f$
$34.5 - 68 = -33.5$	$(-33.5)^2 = 1122.25$	$1122.25 * 3 = 3366.75$
$44.5 - 68 = -23.5$	$(-23.5)^2 = 552.25$	$552.25 * 1 = 552.25$
$54.5 - 68 = -13.5$	$(-13.5)^2 = 182.25$	$182.25 * 8 = 1458$
$64.5 - 68 = 3.5$	$3.5^2 = 12.25$	$12.25 * 10 = 122.5$
$74.5 - 68 = 6.5$	$6.5^2 = 42.25$	$42.25 * 7 = 295.75$
$84.5 - 68 = 16.5$	$16.5^2 = 272.25$	$272.25 * 7 = 1905.75$
$94.5 - 68 = 26.5$	$26.5^2 = 702.25$	$702.25 * 4 = 2809$

$$s = \sqrt{\frac{\sum (x-\overline{x})^2 f}{n-1}} \approx 16.4$$



OGIVE curve

NOTE: little variation in answers are possible, method and steps are important.