Assignment - 2

Q) $x = \{23, 21, 20, 19, 24, 27, 28\}$ find Variance and standard deviation?

Sol) wkt,

$$\sigma^2 = \sum_{i=1}^{N} \frac{(x_i - \bar{x})^2}{n-1}$$

$$\bar{x} = \frac{23+21+20+19+24+27+28}{7}$$

$$= \frac{162}{7} = 23.14$$

x	$\bar{x}$	$x_i - \bar{x}$	$(x_i - \bar{x})^2$
23	23.14	-0.14	0.0196
21	23.14	-2.14	4.579
20	23.14	-3.14	9.859
19	23.14	-4.14	17.139
24	23.14	0.86	0.739
27	23.14	3.86	14.899
28	23.14	4.86	23.619
			$\Sigma = 70.853$

~~$\sigma^2 = 0.0196 + 4.$~~

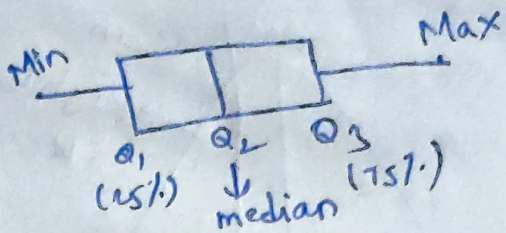
$$\sigma^2 = \frac{70.853}{6} = 11.80$$

Variance

$$\sigma = \sqrt{11.80} = 3.436$$

Standard deviation

Q) Find the outliners of {-8, 1, 2, 4, 5, 6, 8, 15, 20, 120} using Body plot?



Lower fence $= Q_1 - 1.5(IQR)$

higher fence $= Q_3 + 1.5(IQR)$

$IQR = Q_3 - Q_1$

$Q_1 = \frac{25}{100} \times (n+1)$

$Q_3 = \frac{75}{100} \times (n+1)$

$Q_1 = \frac{25}{100_4} \times 11 = 2.75$ (Index)

$Q_3 = \frac{\cancel{75}^{25}}{\cancel{100}_4} \times 11 = 8.25$ (Index)

$Q_1 = \frac{1+2}{2} = \frac{3}{2} = 1.5 \rightarrow$ Value

$Q_3 = \frac{15+20}{2} = \frac{35}{2} = 17.5$ (Value)

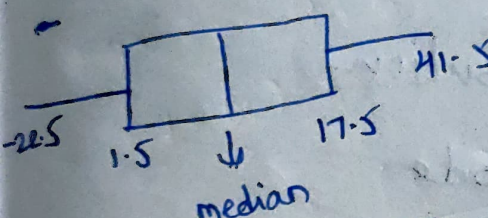
$IQR = 17.5 - 1.5 = 16$

lower fence $= 1.5 - 1.5(16)$

$= -22.5$

higher fence $= 17.5 + 1.5(16)$

$= 41.5$



120 is outliner

Another way

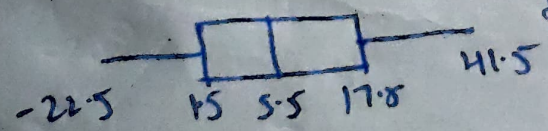
{-8, 1, 2, 4, 5, 6, 8, 15, 20, 120}

1.5 (median)

5.5 (median)

$\frac{35}{2} = 17.5$ (median)

20.



find lower fence & higher fence

$Q_1 - 1.5(IQR)$

$Q_3 + 1.5(IQR)$