

Quiz Tues Mar 12 Section 3.3

Tues Mar 19 Section 6.1

Test 3

Wed Mar 13

3.1-3.3, 4.1-4.3, 5.1
(8 questions)

Practice Problems on website
Formula sheet will be provided

Recap of 6.1/6.2

μ = population mean

\bar{x} = sample mean

median = middle value

} all measure
the centre

range = largest value - smallest value

σ = population standard deviation

} measure
spread
of
data

Larger $\sigma \Rightarrow$ data is more spread out.

6.2 Measures of Spread

Ex: What happens to the mean, median, range and standard deviation if:

a) every measurement is increased by 8?

mean increases by 8

median "

range is the same

standard deviation is the same

b) every measurement is multiplied by 8?

mean is multiplied by 8

median "

range "

standard deviation "

ASIDE : Won't Be Tested

Population : 10, 40, 67

$$\mu = \frac{10 + 40 + 67}{3} = 39$$

x	$x - \mu$	$(x - \mu)^2$
10	-29	841
40	1	1
67	28	784

$$\sigma^2 = \frac{841 + 1 + 784}{3}$$
$$= 542$$

$$\sigma = \sqrt{542}$$
$$\approx 23$$

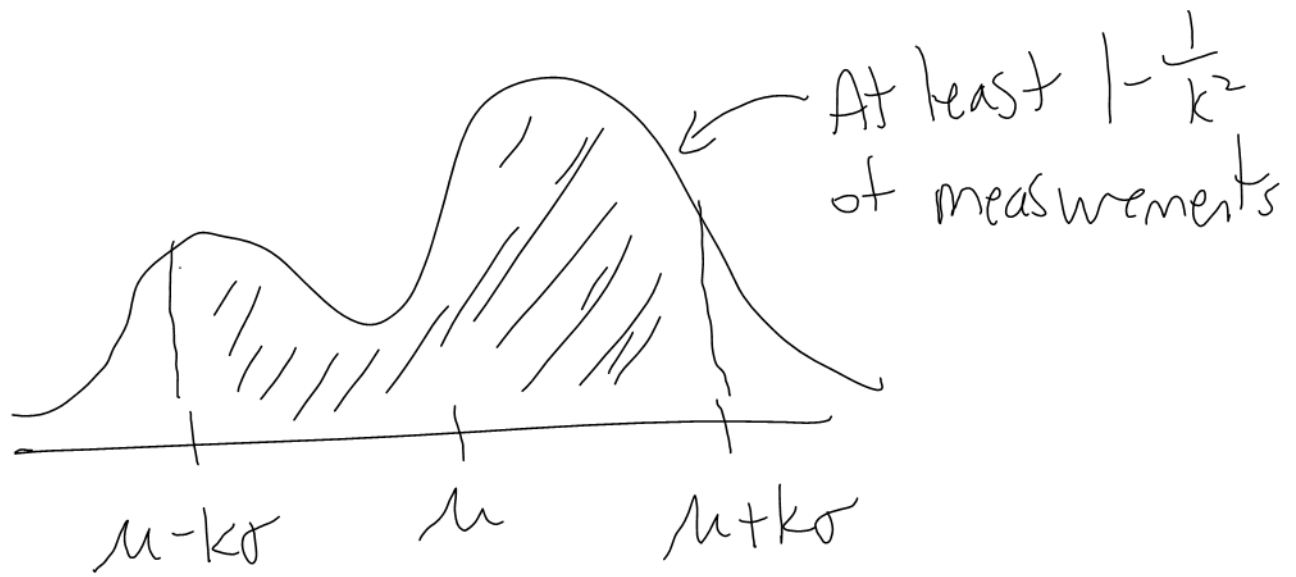
6.3 Tchebysheff and Empirical Rules

Tchebysheff's Rule

For any data set :

At least $(1 - \frac{1}{k^2})$ of the measurements

lie within the interval $\mu - k\sigma \leq x \leq \mu + k\sigma$, where k is a real number > 1 .



Ex: The mean of a data set is 25 and the standard deviation is 4. What percentage of the measurements will fall between 14.2 and 35.8?

$$35.8 = \mu + k\sigma$$

$$35.8 = 25 + k(4)$$

$$10.8 = k(4)$$

$$2.7 = k$$

$$1 - \frac{1}{k^2} = 1 - \frac{1}{2.7^2}$$

$$\approx 0.86$$

At least 86% of measurements fall between 14.2 and 35.8

Ex: The average age of programmers at a certain company is 31, with a standard deviation of 5.

Find the range in which at least 56% of the ages fall.

$$1 - \frac{1}{k^2} = 0.56$$

$$1 - 0.56 = \frac{1}{k^2}$$

$$0.44 = \frac{1}{k^2}$$

$$0.44 k^2 = 1$$

$$k^2 = \frac{1}{0.44}$$

$$k = \sqrt{\left(\frac{1}{0.44}\right)}$$

$$\approx 1.5$$

$$\mu = 31, \sigma = 5$$

$$\begin{aligned} \mu - k\sigma & \\ &= 31 - 1.5(5) \\ &= 23.5 \end{aligned}$$

$$\begin{aligned} \mu + k\sigma & \\ &= 31 + 1.5(5) \\ &= 38.5 \end{aligned}$$

At least 56% of the ages
fall in $23.5 \leq x \leq 38.5$