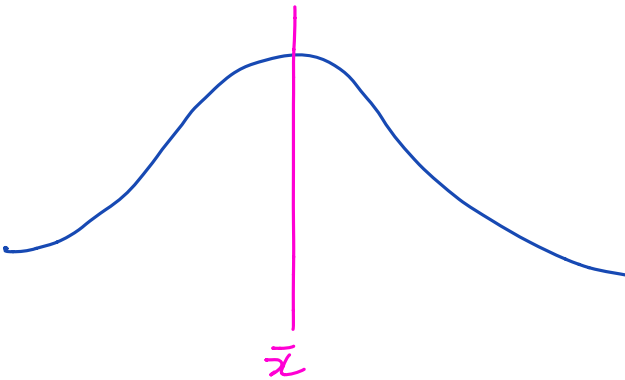


Name: _____

Date: _____

What do we remember about the normal distribution?



- bell curve
 - the mean cuts the curve exactly in half
 - symmetrical
- $\pm \sigma$ 68%
 $\pm 2\sigma$ 95%
 $\pm 3\sigma$ 99.7%

Example The following is a set of class marks on a pop quiz out of 15:

2	4	5	5	6	6	7	7	7	7	8	8	8	8	8
8	9	9	9	10	10	11	11	11	11	12	12	13	13	13

1. Calculate the mean and median of the data set.

Mean = 8.96

Median = 8 Mode = 8

2. The standard deviation of the data set is 2.8. What does this tell us?

- how spread out the quiz marks are.

z-score looks at specific values and compares them to the whole.

3. Create a frequency histogram for this data. Is the data approximately normal?



$$z = \frac{x - \bar{x}}{\sigma}$$

$$= \frac{4 - 8.96}{2.8}$$

$$= -1.77$$

$$= 0.0384 \times 100$$

$$= 3.84\%$$

got a mark lower

$$100 - 3.84 = 96.16\% \text{ got a mark higher than } 4.$$

than 4.

Example Caitlin plays in her school jazz band. Band members practise an average of 6.5 hours per week with a standard deviation of 4.2 hours. Caitlin practises an average of 22 hours per week. How could you estimate the percent of band members that practise, on average, more than Caitlin?

$$\bar{x} = 6.5 \text{ hours}$$

$$\sigma = 4.2 \text{ hours}$$

$$x = 22 \text{ hours}$$

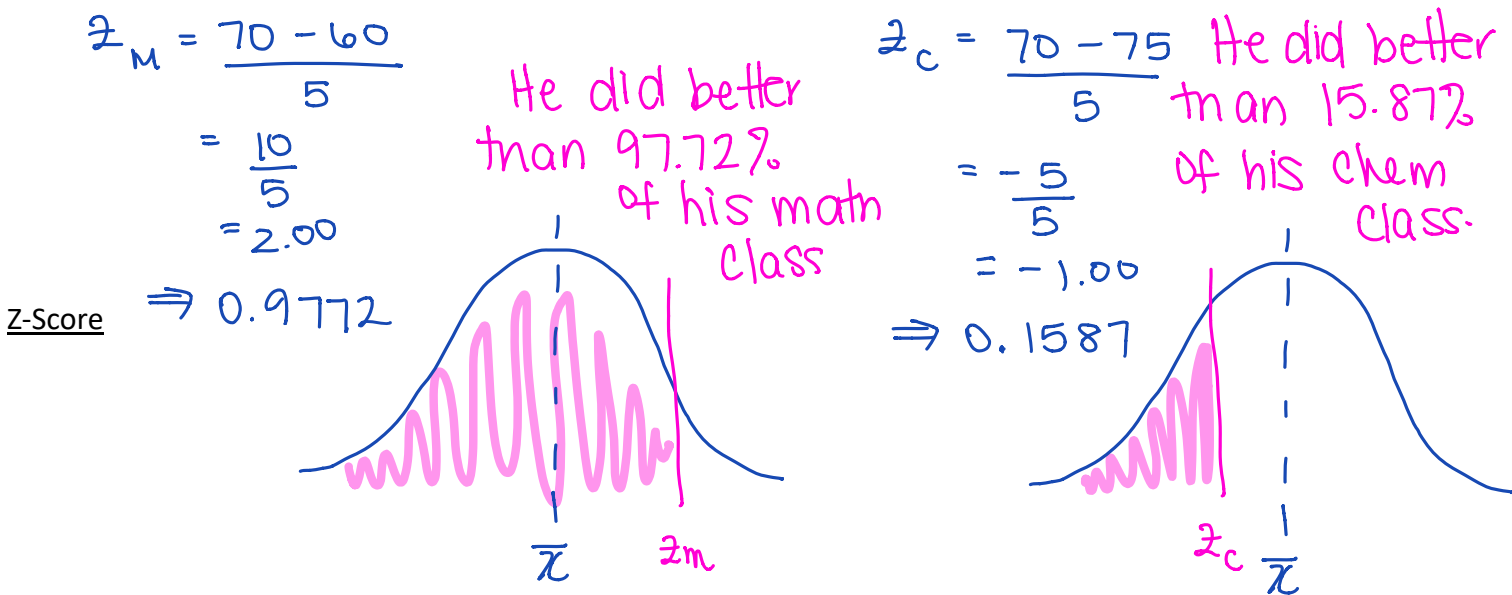
$$\begin{aligned} z &= \frac{x - \bar{x}}{\sigma} \\ &= \frac{22 - 6.5}{4.2} \\ &= 3.69. \end{aligned}$$

The biggest z -value that the table holds is 3.49. The percentage of the population that lives below that value is 99.98%

- Caitlyn is an outlier
- no one practices more than she does.

$$z = \frac{x - \bar{x}}{\sigma}$$

Example James got a mark of 70% on a Math unit test where the class mean was 60% and the standard deviation was 5%. On a Chemistry test he also scored 70%. For the chemistry test, the class mean was 75% and the standard deviation was 5%. Which test did he do better on, relative to his class? Why?



Example Hailey and Sam belong to a running club in Vancouver and train to run the 200 m sprint. At higher altitudes run times improve. For their club, 200 m sprint times are approximately normal. The statistics for the 200 m sprint for the club are listed below:

Location	Altitude (m)	Mean (s)	Standard Deviation (s)	Hailey's Time(s)	Sam's Time (s)
Vancouver	4	25.75	0.62	24.95	25.45
Lake Louise	1661	25.57	0.60	24.77	27.24

- In which location was Hailey's time better, when compared to the club results?
- In which location was Sam's time better, when compared to the club results?