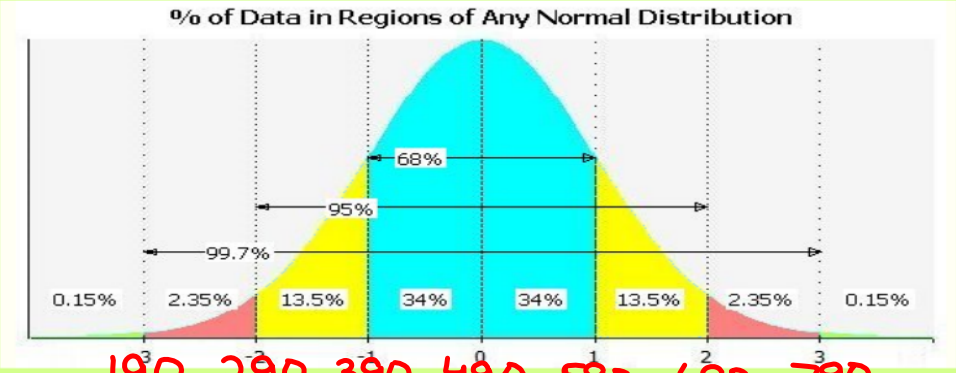
Warm-up

The scores for all high school seniors taking the verbal section ofthe SAT last year had a mean of 490 and s.d. of 100. The distribution of scores is bell-shaped.



190 290 390 490 590 690 790

1. What percent of seniors scored between 390 and 590?

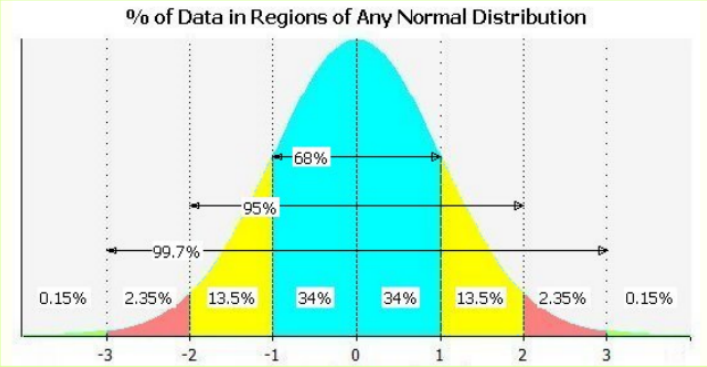
68%

2. One student scored 790 on the test. How did this student do compared to the rest of the class?

100% - .15% = 99.85%

3. A rather exclusive university only admits students who were among the highest 16% of the scores. What score would a student need to qualify for admittance?

590 or higher



Suppose somebody scored 2 standard deviations above the mean. They scored higher than what percent of the population?

97.5%

Suppose somebody scored 2.25 standard deviations above the mean. They scored higher than what percent of the population?

* Have to use z-scores

Z-scores indicate the number of standard deviations above or below the mean a value is located.

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

x =raw score, or value

μ =population mean

σ =standard deviation

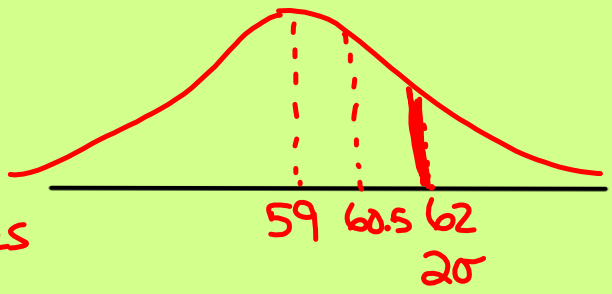
Example

Find the z-score of a person whose height is 62 inches. The population mean height is 59 inches with a standard deviation of 1.5 inches.

$$z = \frac{x-\mu}{\sigma} = \frac{62-59}{1.5} = 2$$

Interpret your answer.

A height of 62 inches is 2σ's above the mean.



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

x =raw score, or value
μ =population mean
σ =standard deviation

You try

Find the z-score of a person who scored a 79 on a test. The class mean was an 84 with a standard deviation of 3.

$$Z = \frac{x-\mu}{\sigma} = \frac{79-84}{3} = \frac{-5}{3} = -1.67$$

Interpret your answer.

A score of 79 is 1.67 σ's below the mean

Example

Find the raw score of a person who has a z-score of 2.95, given a mean of 92 and standard deviation of 3.

$2.95 = \frac{x - 92}{3}$ · 3

$8.85 = x - 92$

$+92 \quad +92$

$100.85 = x$

You try...

Find the raw score of a person who has a z-score of -1.17 given a mean of 87.5 and standard deviation of 6.1.

$-1.17 = \frac{x - 87.5}{6.1}$ · 6.1

$-7.137 = x - 87.5$

$+87.5 \quad +87.5$

$80.36 = x$

...