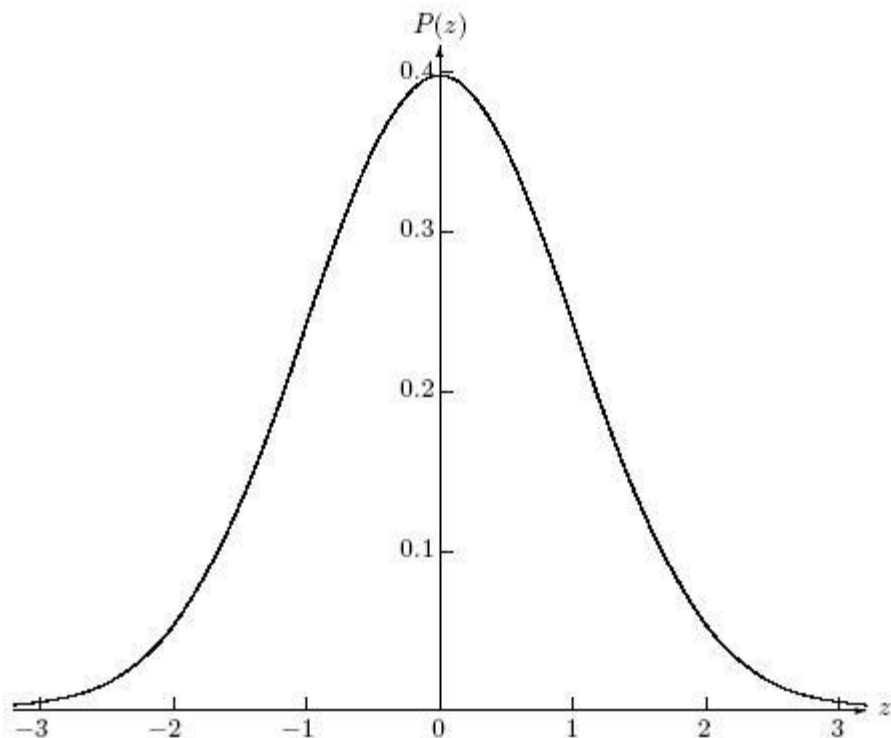


Calculating Z-scores

- A z-score tells you where you are on the generic normal distribution curve
- Most z-scores are between -3 and 3 (because 99.7% of the data is between -3 and 3!)



Finding a z-score: the formula

$$z = \frac{x - \mu}{\sigma} \quad (\text{where } x \text{ is the data value})$$

A set of Economics Final Exam Grades are normally distributed with a mean of 65 and a standard deviation of 12.

Find a z-score for a grade of 70.

$$z = \frac{70 - 65}{12} = 0.42$$

Find a z-score for a grade of 62.

$$z = \frac{62 - 65}{12} = -0.25$$

Find a z-score for a grade of 49.

$$z = \frac{49 - 65}{12} = -1.33$$

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

A set of data is normally distributed with a mean of 415 and a standard deviation of 27.

Find a z-score for a data value of 400.

$$z = \frac{400 - 415}{27} = -0.56$$

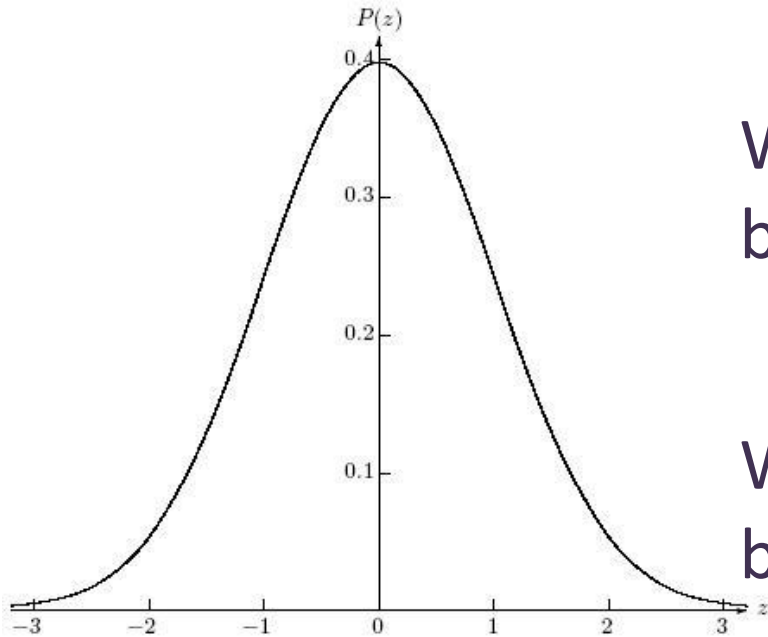
Find a z-score for a data value of 435.

$$z = \frac{435 - 415}{27} = 0.74$$

Find a z-score for a data value of 482.

$$z = \frac{482 - 415}{27} = 2.48$$

Using Z-scores to Find Percentages



What percentage of data values are between the z-values of -1 and 1?

68%

What percentage of data values are between the z-values of -1 and 0?

34%

What percentage of data values are below -2?

2.5%

Using the calculator to Find Percentages Between Two Z-Values (or data values)

- Find DISTR (which is above VARS—so press 2nd VARS)
- Choose 2 normalcdf
- You will now list 4 numbers with commas between them—Lower value, Upper Value, Mean, Standard Deviation

- ENTER

EXAMPLE: Find the percentage that your z-score is between -2 and 2. 0.95=95%

EXAMPLE: Find the percentage that your z-score is between -3 and -1. 0.16=16%

EXAMPLE: Find the percentage that your z-score is between 1.5 and 1.8. 0.03=3%

You can use this function on the calc. for ANY data set that you know the mean and std dev!

EXAMPLE: A data set is normally distributed with a mean of 35 and std dev of 7. Find the percentage that a data value is between 29 and 33.

$$\text{normalcdf}(29, 33, 35, 7) = 0.19 = 19\%$$

EXAMPLE: A data set is normally distributed with a mean of 4712 and std dev of 1268. Find the percentage that a data value is between 3300 and 5000.

$$\text{normalcdf}(3300, 5000, 4712, 1268) = 0.46 = 46\%$$

Classwork—turn in when you finish!

The ages of a group of people is normally distributed with a mean of 34 and a standard deviation of 4.

1. Find a z-score for a person age 30.
2. Find a z-score for a person age 37.
3. Find a z-score for a person age 23.

Find each percentage (some require the calculator):

4. z-score above 3
5. z-score between -3 and -2
6. z-score between 0 and 1
7. z-score between -1 and 0.5
8. z-score between -2.7 and -1.3

A data set has a normal distribution with mean 250 and std dev of 30. Find each:

9. Percentage of data values between 200 and 220.
10. Percentage of data values between 245 and 260.