**The Normal Distribution**

Look below at the following frequency polygon charts:



These curves look different because they have different means and standard deviations, but they will all be similar.



What do you notice about the approximate shape of the graph?  It resembles a \_\_\_\_\_.  In reality, a lot of data follows this type of shape when it is graphed.  Generally, measurements of living things (such as mass, height and length) have this bell shape.

Since it is so common in living things, mathematicians have given it a special name called a **Normal Distribution**.

Every bell curve or Normal distribution follows some basic rules or properties:

* Every normal distribution has a mean (\_\_\_\_\_ or \_\_\_\_\_) and a standard deviation (\_\_\_\_\_).
* The **mean, median, and mode** are \_\_\_\_\_\_\_\_ (or close) and fall at the line of symmetry.
* The graph is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ about the mean (\_\_\_\_\_\_\_\_% on each side)
* Almost all data lie within \_\_\_\_\_standard deviations of the mean.
* The total area under the curve represents \_\_\_\_\_\_\_\_\_ of the data and can be considered 1 unit.
* The Normal distribution follows the \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_\_% rule.

About 68% of the data are within \_\_\_\_\_\_\_\_ standard deviation

About 95% of the data are within \_\_\_\_\_\_\_\_ standard deviation

About 99.7% of the data are within \_\_\_\_\_\_\_\_ standard deviation



Normal curves can vary in two main ways: the mean determines the location of the centre of the curve on the horizontal axis, and the standard deviation determines the width and height of the curve.

Read through example 1 p. 270-272

1. Example p. 279 #1 Read through example p. 273-274 to show how percentages are found.

 The ages of members of a seniors curling club are normally distributed, with a mean of 63 years and a

 standard deviation of 4 years. What percent of the curlers is in each of the following age groups?

 Sketch the graph to show the distribution.

**a)** between 55 and 63 years old

**b)** between 67 and 75 years old

**c)** older than 75 years old

The data set of class marks has been ordered from least to greatest.

**2, 4, 5, 6, 6, 6, 7, 7, 7, 7, 8, 8, 8, 8, 8, 8, 9, 9, 9, 10, 10, 11, 11, 11, 12, 12, 13, 13, 15**

1. calculate the mean, median, and standard deviation

\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_

b.  create a frequency table \*On a bell curve, the interval is the standard deviation\*

c. create a frequency polygon

d. explain why the distribution is or is not approximately normal.

|  |  |
| --- | --- |
| Class Marks | Frequency |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

Example p.279 3a)

Is the data in each set normally distributed? Explain.





**Example:** The results for the first round of the 2009 Masters Golf tournament are given below.



a) Are the golf scores normally distributed?

Determine the mean, median, and standard deviation.

\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_

 Create a frequency table. Sketch a frequency polygon.

|  |  |
| --- | --- |
| Score (interval) | Frequency |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

b) Explain how the measures of central tendency support your decision in part a).

Example: The mass of an Appaloosa horse is generally in the range of 431 kg to 533 kg. Assuming that the

 data is normally distributed, determine the mean and standard deviation for the mass of an

 Appaloosa. Justify your answers.

Solution to last two examples of notes:

***Solution: Golf Tournament***



***Solution: Horse Question***

