Normal Distribution

Something to Consider:

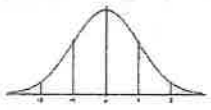
- How are the heights of professional athletes distributed?

The frequency table below lists the heights of the 2014 Green Bay Packers. The table shows the heights of the players but not how these heights compare to the height of an average player. To make this comparison, you can determine how the heights are distributed.

Height (in)	70	71	72	73	74	75	76	77	78	79
Frequency	2	6	6	13	6	17	11	3	1	1

Normal and Skewed Distributions

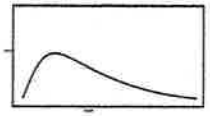
- Discrete probability distributions: have a finite number of possible values
- Continuous probability distribution: outcome can be any value in an interval of real numbers (represented by curves)
- Distributions with symmetric curves(also called a bell curve) are called normal distributions.



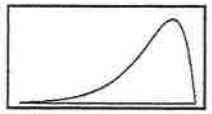
Skewed Distribution

- A curve that is not symmetric.

Positively Skewed



Negatively Skewed



Example 1: Determine whether the data {14, 15,11, 13, 13, 14, 15, 14, 12, 13, 14, 15} appear to be positively skewed, negatively skewed, or normally distributed?

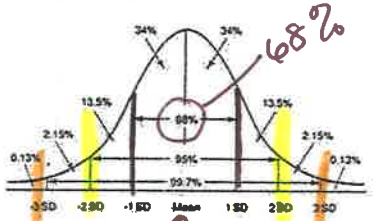
Make a frequency table. Then use the table to make a histogram.

value	11	12	13	14	15
freq.	1	1	3	4	3

high right tail left data is negatively skewed

Using Normal Distributions

- Normal distributions have the following properties:
- About 68% of the values are within one standard deviation of the mean.
- About 95% of the values are within two standard deviations of the mean.
- About 99% of the values are within three standard deviations of the mean.



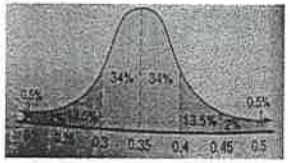
68%

mean

Example 2: The reaction times for a hand-eye coordination test administered to 1800 teenagers are normally distributed with a mean of 0.35 seconds and a standard deviation of 0.05 seconds.

About how many teens had reaction times between 0.25 and 0.45 seconds?

What is the probability that a teenager selected at random had a reaction time greater than 0.4 seconds?



① normal curve
.25 & .45 are 2 stand. dev. = 95% in that range
1800 x .95 = 1710 teens

② .4 is one σ above the mean
100 − 68 = 32% is >
half of 32 is 16%
of data is > than
probability is .16 or 16%