

## Statistical Reasoning

### HW #3 Normal Distribution

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Class: \_\_\_\_\_

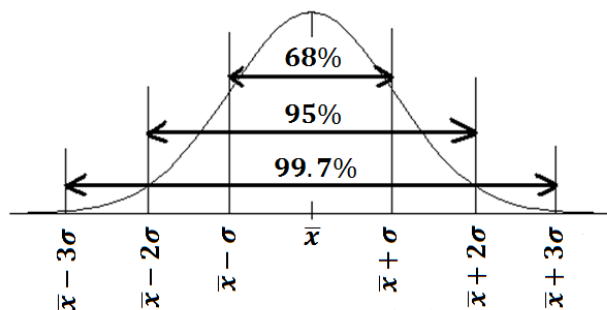
#### The Empirical Rule: Word problems

**Definition:** A probability distribution modeled by a bell-shaped curve (also called a normal curve) that is symmetric about the mean.

$\sigma$  = standard deviation of the data set  
 $\mu$  = mean of the data set

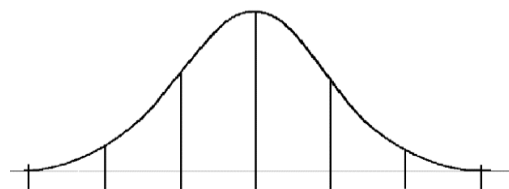
#### Properties of the Bell Curve

- **68%** of the data lies within **1** standard deviation of the mean
- **95%** of the data lies within **2** standard deviations of the mean
- **99.7%** of the data lies within **3** standard deviations of the mean



**Example:** At State University, 2000 freshmen took a math test. The scores were distributed normally with a mean of 70 and a standard deviation of 5. Label the mean and three standard deviations from the mean.

- What percentage of scores are between scores 65 and 75?
- What percentage of scores are between scores 60 and 70?
- What percentage of scores are between scores 60 and 85?
- What percentage of scores is less than a score of 55?

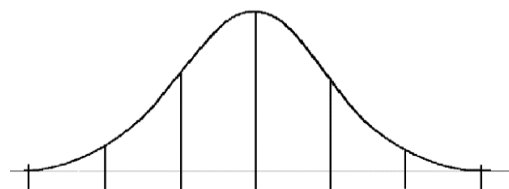


- What percentage of scores is greater than a score of 80?
- Approximately how many biology students scored between 60 and 70?

#### **You try...**

- At Central High School, 500 juniors took the ACT last year. The scores were distributed normally with a mean of 24 and a standard deviation of 4. Label the mean and three standard deviations from the mean.

- What percentage of scores are between scores 20 and 28?
- What percentage of scores are between scores 16 and 32?
- What percentage of scores are between scores 16 and 28?
- What percentage of scores is less than a score of 12?

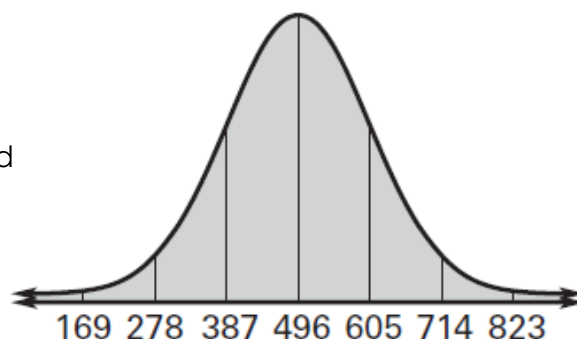


- What percentage of scores is greater than a score of 24?

- (f) Approximately how many juniors scored between 24 and 28?
2. The math scores for an exam for the state of Georgia are normally distributed with a mean of 496 and a standard deviation of 109.

(a) About what percent of the test-takers received scores between 387 and 605?

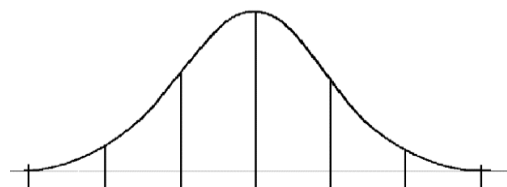
(b) What percent of test-takers received scores between 496 and 714?



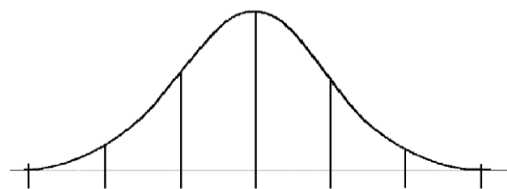
3. The data set below gives the distances, in miles, that the employees in a small office travel to work each day. Determine the range, in miles, in which 68% of the employees travel to work each day.

*Hint: Complete the bell curve to help answer this question.*

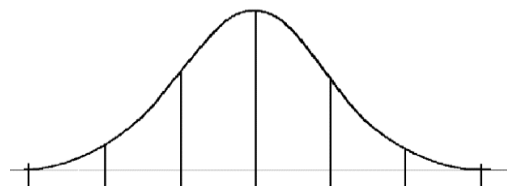
12, 15, 11, 8, 11, 13, 10, 16



4. A data set is bell-shaped with a mean of 319. If 95% of the data lies between 205 and 433, what is the standard deviation?



5. A data set is normally distributed with a mean of 127 and a standard deviation of 81. What percentage of data should lie between 127 and 370?

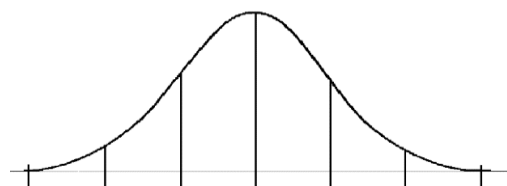


6. The mean life of a tire is 30,000 km. The standard deviation is 2000 km.

(a) 68% of all tires will have a life between \_\_\_\_\_ km and \_\_\_\_\_ km.

(b) 95% of all tires will have a life between \_\_\_\_\_ km and \_\_\_\_\_ km.

(c) What percent of the tires will have a life that exceeds 26,000 km?



(d) If a company purchased 2000 tires, how many tires would you expect to last more than 28 000 km?