Day 02 Notes on Normal Distribution

What facts are known about the amount of sleep we humans need?

Here is what some experts are saying...

According to Dr. Phyllis Zee from Northwestern University's Feinberg School of Medicine: *"There is increasing evidence that there is a very strong relationship between sleep quality and physical and mental health..."* Dr. Zee sites a national survey of 31,044 adults which revealed a link between insomnia and other sleeping problems with high blood pressure, heart failure, anxiety, and depression. While Dr. Zee states that there is no evidence yet to indicate that acquiring more sleep will improve medical conditions, she points out that studies have shown that more sleep makes teenagers do better in school.

The US National Sleep Foundation suggests seven to nine hours of sleep a night for adults. The Foundation conducted a survey in 2002 that suggested as many as 75% of Americans had problems sleeping, with one-third being so sleepy during the day that it affected their lives and activities.

Professor James Home, director of Loughborough University's Sleep Research Centre, when asked if everyone needed 8 hours of sleep each night, stated: *"It's nonsense. It's like saying everybody should have size eight shoes, or be five foot eight inches... There is [however] a normal distribution - the average sleep length is seven and a quarter hours."* The Professor states that many people report sleeping more or less than the average, and that the determining factor for a required amount of sleep is whether the person feels fresh and alert during the day.

While sleep undergoes a wide variety of modifications during the human life span (based primarily upon age), all aspects of sleep, at any given age, have a relatively normal, bell-shaped distribution.

ACTIVITY:

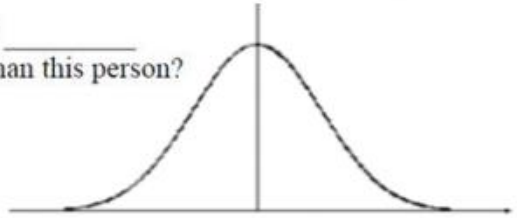
Record, to the nearest quarter of an hour, how many hours you slept in the past 24 hours.

_____ hours

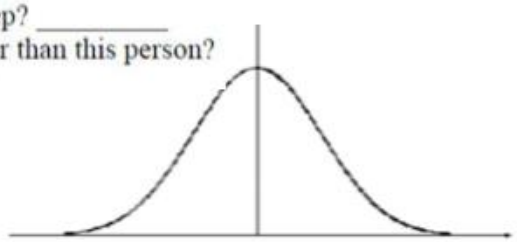
SURVEY:

A previous survey administered to high school students showed that the amount of sleep (in hours) in a 24-hour period is normally distributed with a mean of 7 hours and a standard deviation of 1.25.

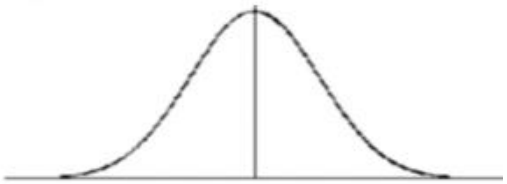
How long did the person who slept the least in your group sleep? _____
What percent of high school students from the survey slept less than this person?



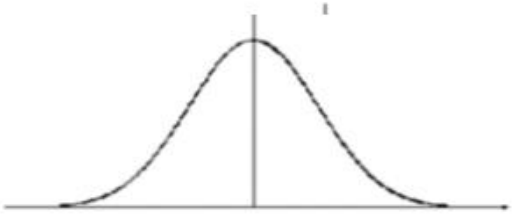
How long did the person who slept the longest in your group sleep? _____
What percent of high school students from the survey slept longer than this person?



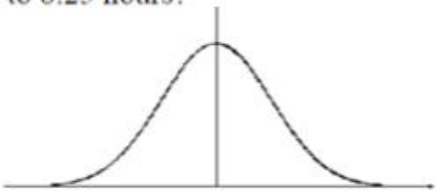
Another student, Kyle, is late to class and is assigned to your group. Kyle says he slept 8.5 hours.
What percent of high school students from the survey slept less than Kyle?



Your Principal comes into your class and announces that he slept 7.25 hours. What percent of high school students from the survey slept longer than the Principal?



What percent of the data in the survey lies in the interval from 5.75 to 8.25 hours?



☺ If 250 students were surveyed, HOW MANY students slept between 5.75 to 8.25 hours?