Time Frame: 50 minutes

Subject Matter: Applications of the Normal Distribution

TELL ME

Objective: TSWBAT find the probabilities for a normally distributed variable by transforming it into a standard normal variable

Standards: DA – 4.8

 Materials: PowerPoint Presentation and Worksheets

SHOW ME

Presentation of Information:

The teacher will discuss the following problems.

1. The average number of hours an American worker spends on the computer is 3.1 hours per workday. Assume the standard deviation is 0.5 hour. Find the percentage of workers who spend less than 3.5 hours on the computer. Assume the variable is normally distributed.

*Source: USA TODAY*

 Solution:

Step 1: Draw the figure and represent the area.



 Step 2: Find the z – value corresponding to 3.5.

 $z= \frac{value-mean}{standard deviation}= \frac{3.5-3.1}{0.5}=0.80$

 Hence, 3.5 is 0.80 standard deviation above the mean 3.1.

 Step 3: Find the area using Table E. The area between z = 0 and z = 0.80 is 0.2881. Since the area under

the curve to the left of z = 0.80 is desired, add 0.5000 to 0.2881 (0.5000 + 0.2881 = 0.7881.

Therefore, 78.81% of the workers spend less than 3.5 hours per day on the computer.

Try the following.

1. Each month, an American household generates an average of 28 pounds of newspaper for garbage or recycling. Assume the standard deviation is 2 pounds. If a household is selected at random, find the probability of its generating
2. Less than 28 pounds per month.
3. Between 27 and 31 pounds per month.
4. More than 30.2 pounds per month.

Assume the variable is approximately normally distributed.

 *Source: Michael D. Shook and Robert L. Shook, The Book of Odds.*

1. The American Automobile Association reports that the average time it takes to respond an emergency call is 25 minutes. Assume the variable is approximately distributed and the standard deviation is 4.5 minutes. If 80 calls are randomly selected approximately how many will be responded to in less than 15 minutes?

Classwork

1. The average number of calories in a 1.5-ounce chocolate bar is 225. Suppose the distribution of calories is approximately normally distributed with a standard deviation of 10. Find the probability that a randomly selected chocolate bar will have
2. Between 200 and 220 calories.
3. Less than 200 calories.

*Source: The Doctor’s Pocket Calorie, Fat, and Carbohydrate Counter*

1. The average credit card debt for college seniors is $3,262. If the debt is normally distributed with a standard deviation of $1,100, find these probabilities
2. That a senior owes at least $1,000. ($1,000 or more)
3. That a senior owes more than $4,000.
4. That a senior owes between $3,000 and $4,000.

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1. In less than 20 minutes.
2. Between 20 and 30 minutes.

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