

Normal Distribution: Finding Probabilities Homework

Name Master E
Date _____ Block _____

1. The amount of time a middle school student studies in a night is normally distributed with a mean of 30 minutes with a standard deviation of 7 minutes.

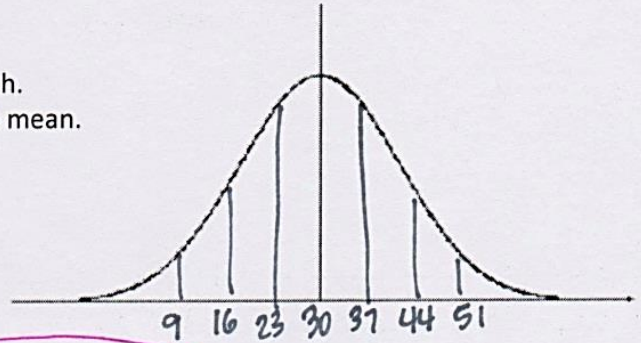
a. Represent the information using a normal distribution graph. Show three standard deviations to the left and right of the mean.

b. Find the z-score for a student who studies for 60 minutes.

$$z = \frac{60-30}{7} = 4.285 \approx 4.29$$

c. Find the amount of time a student studies if the z-score is -3.2.

$$-3.2 = \frac{x-30}{7} \quad -22.4 = x-30 \quad x = 7.6 \text{ minutes}$$



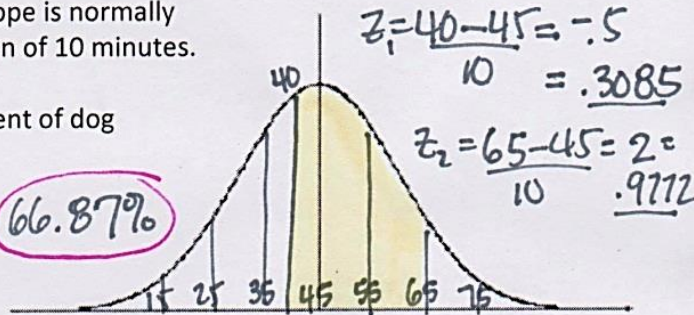
2. The length of time it takes to groom a dog at Shaggy's Pet Shoppe is normally distributed with a mean of 45 minutes and a standard deviation of 10 minutes.

a. Shade the region under the curve that represents the percent of dog grooming times between 40 and 65 minutes.

b. What is that percent? $.9772 - .3085 = .6687 = 66.87\%$

c. Of the 50 dogs that are groomed in a typical week at Shaggy's Pet Shoppe, approximately how many of the grooming times are between 40 and 65 minutes?

$$(50)(.6687) = 33.4 \approx 33 \text{ dogs}$$

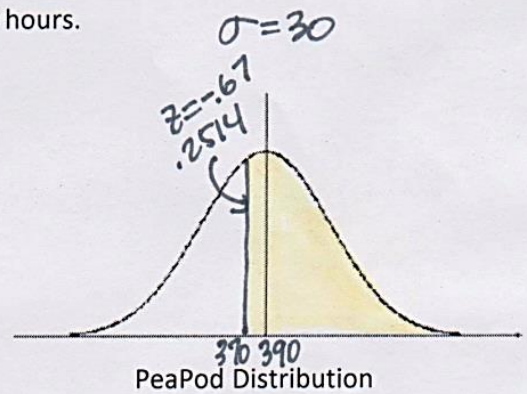
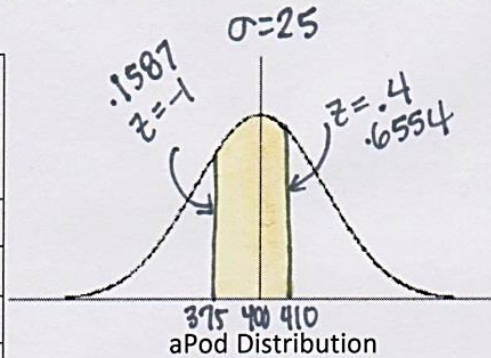


3. The MP3 Player made by Mango Corp., aPod, has an average battery of 400 hours. Battery life for the aPod is normally distributed with a standard deviation of 25 hours.

The MP3 player made by Pineapple Inc., the PeaPod, has an average battery life of 390 hours. The distribution for its battery life is also normally distributed with a standard deviation of 30 hours.

a. Find the z-scores for each battery with lives of 250, 350, 410, and 450 hours.

battery life (hrs)	aPod battery life z-score	PeaPod battery life z-score
250	-6	-4.67
350	-2	-1.33
410	.4	.67
450	2	2



b. Which battery lasting 410 hours (aPod or PeaPod) performed better? Pea Pod $.67 > .4$

c. What percent of the aPod Batteries last between 375 and 410 hours? 49.67% $(.6554 - .1587 = .4967)$

d. What percent of PeaPod batteries last more than 370 hours? 74.86% $(1 - .2514 = .7486)$

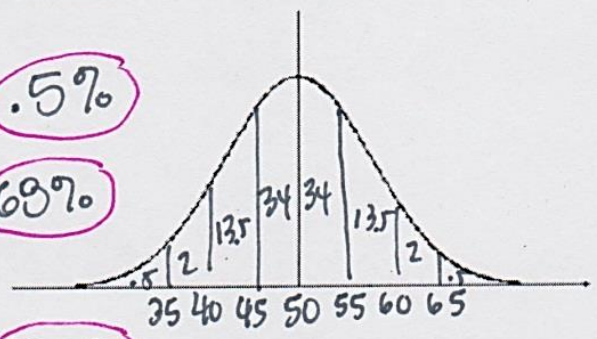
4. **No Calculator/No table:** The braking distance for a Krazy-car traveling at 50 mph is normally distributed with a mean of 50 ft and a standard deviation of 5 ft. $\sigma = 5$

a. What is the likelihood a car will take more than 65 feet to stop? **.5%**

b. What is the probability a car will stop between 45 ft and 55 ft? **69%**

c. What percent of the time will a Krazy-car traveling at 50 mph stop between 35 and 55 ft? $2 + 13.5 + 34 + 34 =$ **83.5%**

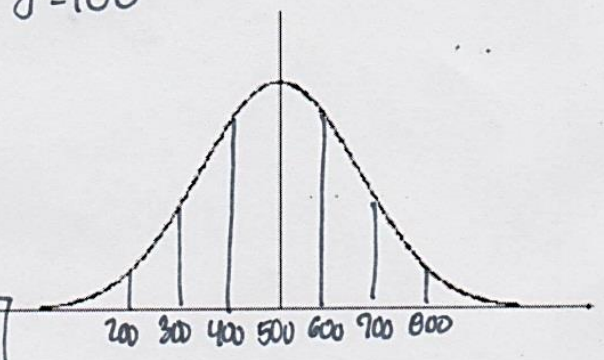
d. What is the probability a car will require less than 50 or more than 60 ft. to stop? $50\% + 2.5\% =$ **52.5%**



5. The College of Knowledge gives an admission qualifying exam. The results are normally distributed with a mean of 500 and a standard deviation of 100. The admissions department would only like to accept students who score in the 65th percentile or better. $\sigma = 100$

a. Complete the chart.

Student Score	z-score	percentile
530	.3	61.79
570	.7	75.80
650	1.5	93.32
800	3	99.87
540	.4	65.54



b. What score is associated with the 65th percentile? **540**

c. Which students qualify for admission? **Anyone who scores 540 or more on the exam.**

6. Each of the following normal curves is graphed in the same viewing window on a graphing calculator. The mean is either 7, 8, 9, or 10. The standard deviation of each is 1, 1.5, 2, or 2.5. Use this information to determine the mean and standard deviation of each graph. Check your answers on the viewing window.

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WINDOW
Xmin=4
Xmax=16
Xscl=1
Ymin=0
Ymax=.4
Yscl=1
Xres=1
    
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