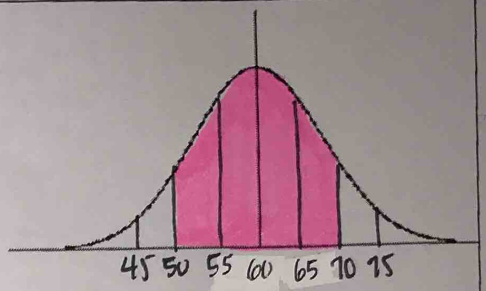
Master Ed

Day 03 Normal Distribution Practice on Finding Probabilities

1-4: Represent all problems with a normal distribution graph shaded with the described probability. Show three standard deviations to the left and the right of the mean and answer all questions according to the Empirical Rule.

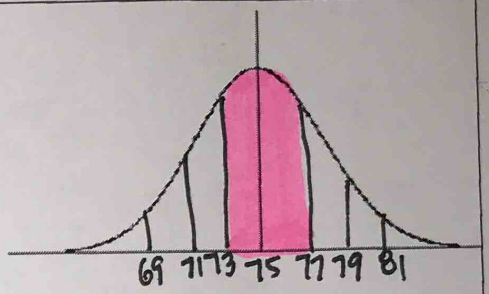
1. The length of wear on Spinning Tires is normally distributed with a mean of 60,000 miles and a standard deviation of 5,000 miles. What percentage of tires last between 50,000 miles and 70,000 miles.

95%

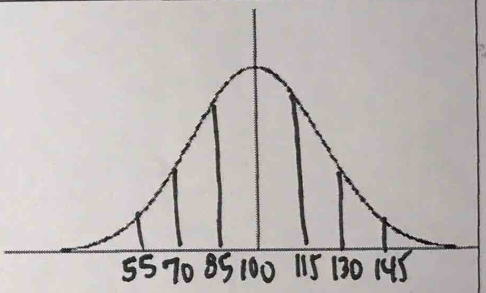


2. The number of crackers in a box of Crackerbox Crackers is normally distributed with a mean of 75 and a standard deviation of 2. What is the probability that a box has between 73 and 77 crackers?

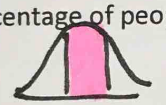
68% .68



3. Suppose that IQ Scores have a normal distribution with a mean of 100 and a standard deviation of 15.

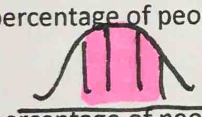


a. What percentage of people have an IQ score between 85 and 115?



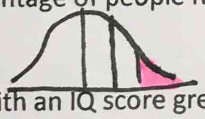
68%

b. What percentage of people have an IQ score between 70 and 130?



95%

c. What percentage of people have an IQ score above 130?

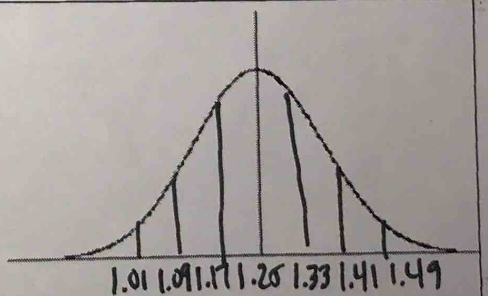


2.5%

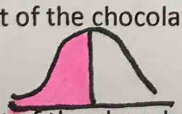
d. A person with an IQ score greater than 145 is considered a genius. Does the Empirical Rule support this statement? Explain.

Yes b/c >145 is in the top .5% of the population!

4. The price of a certain kind of chocolate bar is normally distributed with a mean of $1.25 and a standard deviation of $0.08.

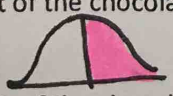


a. What percent of the chocolate bars cost less than $1.25?



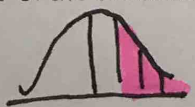
50%

b. What percent of the chocolate bars cost more than $1.25?



50%

c. What percent of the chocolate bars cost more than $1.33?



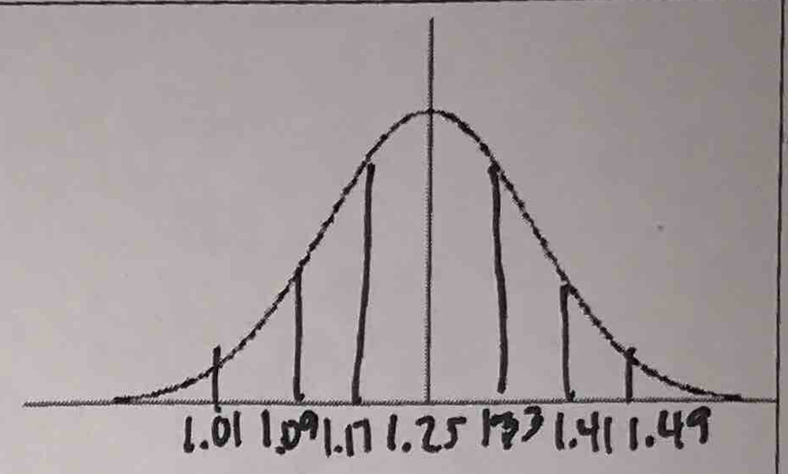
13.5 + 2.5 = 16%

5-9: Represent all problems with a normal distribution graph shaded with the described probability. Show three standard deviations to the left and the right of the mean and answer all questions using the Probabilities table.

5. The price of a certain kind of chocolate bar is normally distributed with a mean of \$1.25 and a standard deviation of \$0.08.

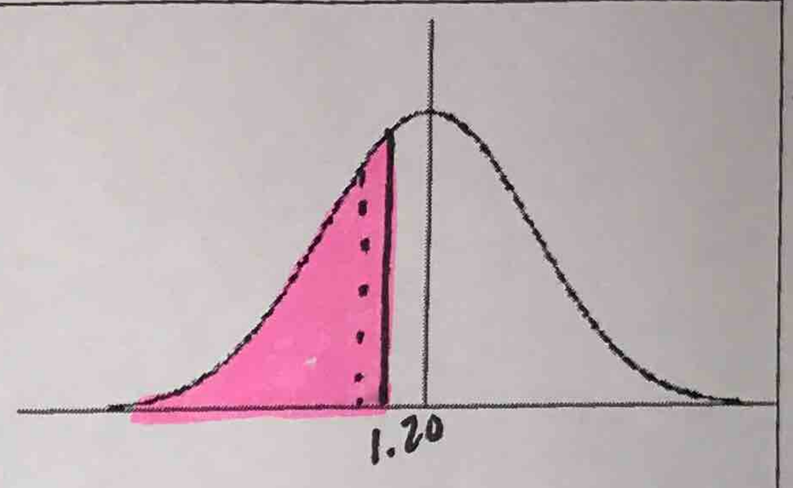
$\mu = 1.25$

$\sigma = 0.08$



6. What is the probability that the chocolate bar has a price that is less than \$1.20?

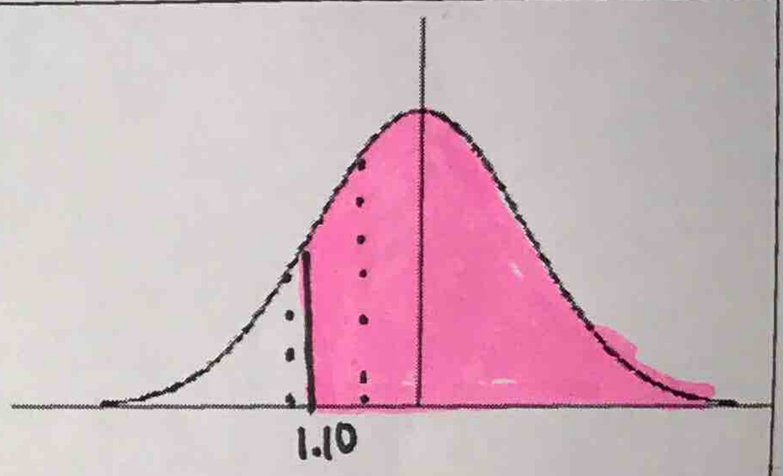
$z = \frac{1.20 - 1.25}{0.08} = -.63 \Rightarrow .2643$



7. What is the probability that the chocolate bar has a price that is more than \$1.10?

$z = \frac{1.10 - 1.25}{.08} = -1.88 \Rightarrow .0301$

$1 - .0301 = .9699$

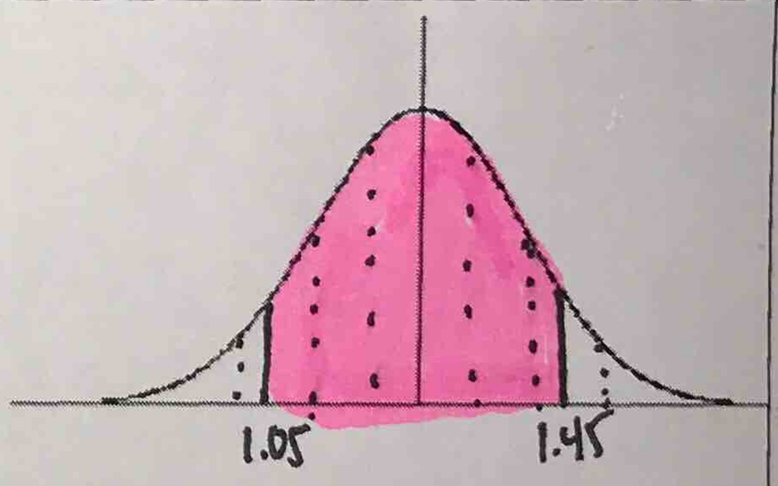


8. What is the probability that the chocolate bar has a price between \$1.05 and \$1.45?

$z = \frac{1.05 - 1.25}{.08} = -2.5 \Rightarrow .0062$

$z = \frac{1.45 - 1.25}{.08} = 2.5 \Rightarrow .9938$

$.9938 - .0062 = .9876$

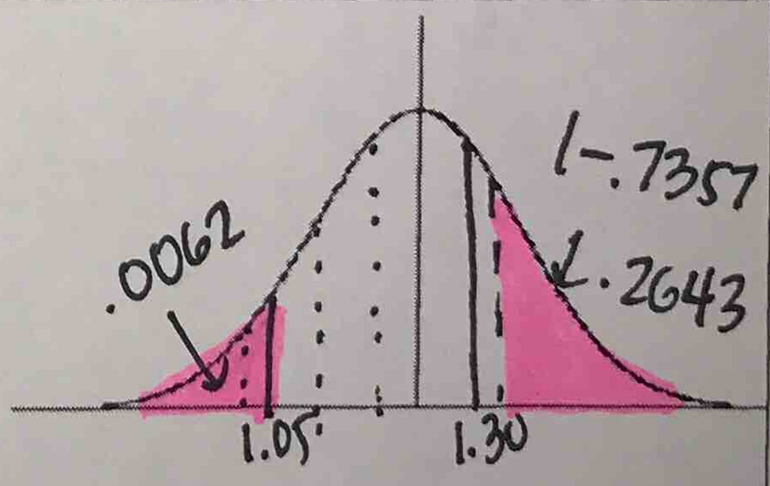


9. What is the probability that the chocolate bar is more than \$1.30 or less than \$1.05?

$z = \frac{1.30 - 1.25}{.08} = .63 \Rightarrow .7357$

$z: 1.05 = -2.5 \Rightarrow .0062$

$.0062 + .2643 = .2705$



10. Out of 200 candy bars, how many would we expect to have a price of less than \$1.20? $.2643(200) = 52.86$ (52)

11. How many of the 200 would we expect to have a price between \$1.05 and \$1.45? $.9876(200) = 197.52$ (197)