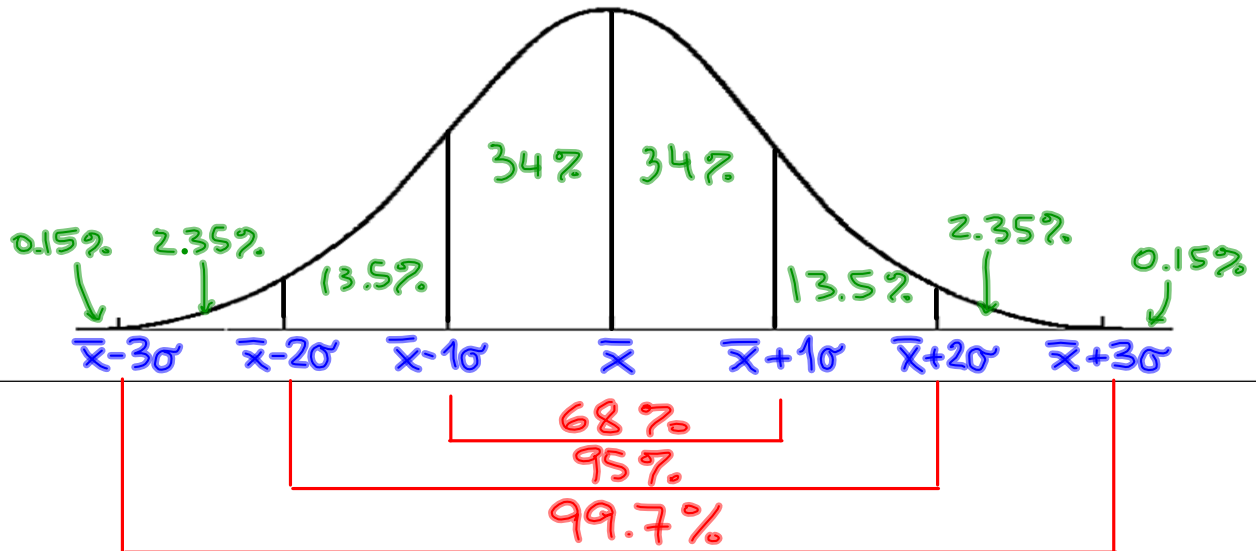
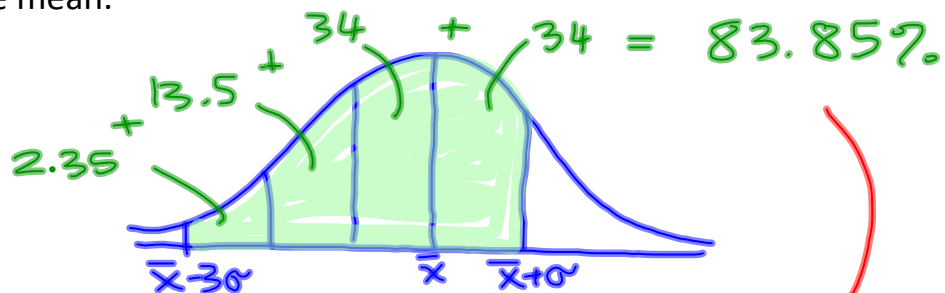


Normal Distribution & The Empirical Rule



Example 1:

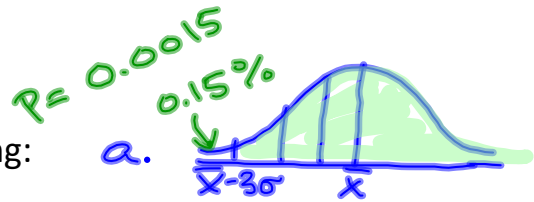
Find the probability that a random number falls in between three standard deviations below the mean and one standard deviation above the mean.



$$P(\bar{x}-3\sigma \leq x \leq \bar{x}+\sigma) = 0.8385$$

Example 2:

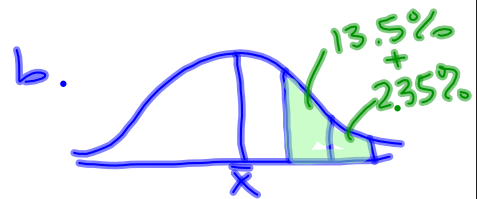
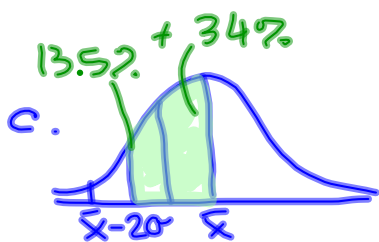
Using the normal curve, find the following:



a. $P(x \geq \bar{x} - 3\sigma) = 1 - 0.0015 = \boxed{0.9985}$

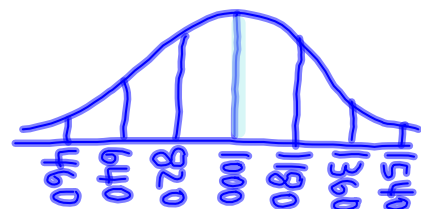
b. $P(\bar{x} + \sigma \leq x \leq \bar{x} + 3\sigma) = 0.135 + 0.0235 = \boxed{0.1585}$

c. $P(\bar{x} - 2\sigma \leq x \leq \bar{x}) = 0.34 + 0.135 = \boxed{0.475}$



Example 3:

The data for the S.A.T. is normally distributed with a mean of 1000 and standard deviation of 180.



a. What is the probability that a randomly selected student scored between 640 and 1180?

$0.135 + 0.34 + 0.34 = \boxed{0.815}$

b. Determine the 84th percentile of scores on the S.A.T.

$\boxed{1180}$

c. Approximately what percent of scores will be above 1360.

$2.35\% + 0.15\% = \boxed{2.5\%}$

d. What S.A.T. scores make up the middle 68% of scores?

$\boxed{820 \text{ to } 1180}$

e. What is the probability a student will score below 820?

$0.5 - 0.34 = \boxed{0.16}$

