Day 3 Notes – The Normal Distribution

Key

Bell curve with .68, .95, .997 labels; positions -3σ -2σ -1σ μ 1σ 2σ 3σ

Bell curve with .34 .34, .0235, .135, .0015 labels; positions -3σ -2σ -1σ μ 1σ 2σ 3σ
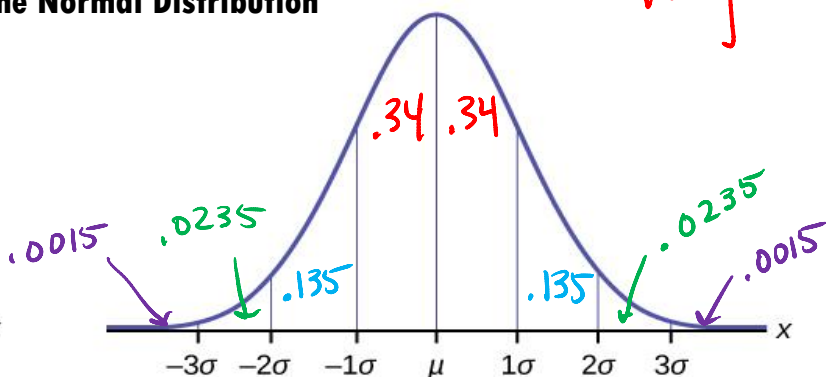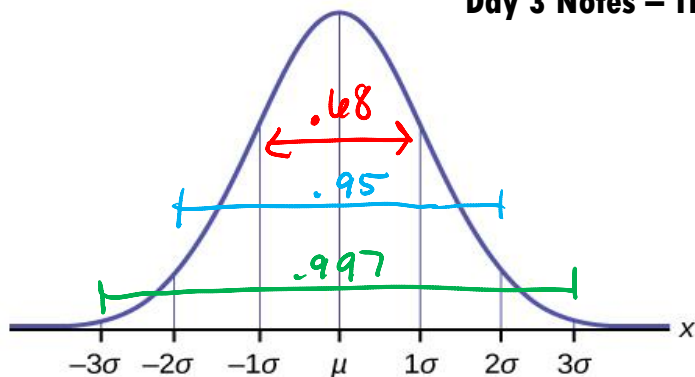
Ex 1: A normal distribution has a mean μ and a standard deviation σ. An x-value is randomly selected from the distribution. Find:

a. $P(x \le \mu)$ $\boxed{.5}$

a. $P(x \ge \mu)$ $\boxed{.5}$

c. $P(\mu \le x \le \mu + 3\sigma)$ $\boxed{.4985}$
$.34 + .135 + .0235$

d. $P(\mu - 2\sigma \le x \le \mu)$ $\boxed{.475}$

e. $P(\mu - \sigma \le x \le \mu + 3\sigma)$ $\boxed{.8385}$

f. $P(\mu - 3\sigma \le x \le \mu + 3\sigma)$ $\boxed{.997}$

Ex 2: The scores for a state's police officer standards and training are normally distributed with a mean of 55 and a standard deviation of 12. The test scores range from 0 to 100.
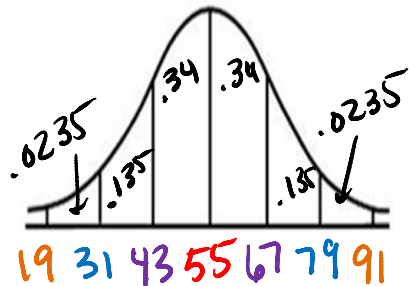
a. About what percent of the people taking the test have scores between 31 and 67?

$.135 + .34 + .34 = .815 = \boxed{81.5\%}$

b. An agency in the state will only hire applicants with test scores of 67 or greater. About what percent of the people have test scores that make them eligible to be hired by the agency?

$.135 + .0235 + .0015 = .16 = \boxed{16\%}$

$\left(1 - .16 = .84 = 84\% \text{ will not be eligible} \right)$

Bell curve with .34 .34, .0235, .135 labels; x-axis values 19 31 43 55 67 79 91

Ex 3: Women's heights are normally distributed with a mean of 65 inches and a standard deviation of 3 inches. Find the percent of woman that have heights x in the following ranges.

a. $x > 65$ $\boxed{.5}$

b. $62 < x < 68$ $\boxed{.68}$

c. $59 < x < 74$ $\boxed{.9735}$

d. $x > 56$ $\boxed{.9985}$

e. $x > 74$ $\boxed{.0015}$

f. $56 < x < 68$ $\boxed{.8385}$

Bell curve with x-axis values 56 59 62 65 68 71 74