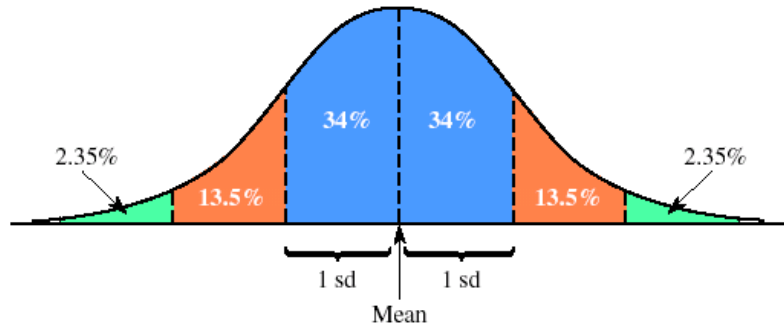**Day 4 Notes – Z-Score**

Key

Recall:

Let's revisit the last problem from the homework: 🪰

The wing lengths of houseflies are normally distributed with a mean of 4.6 millimeters and a standard deviation of 0.4 millimeter.

a. What percent of flies have wing lengths between 4.6 and 5.4? $.34 + .135 = .475 = $ (47.5%)

b. What percent of flies have wing lengths less than 4.1? Now what? doesn't land exactly 1,2,3 standard deviations away 😊

Find the z-score

3.4 3.8 4.2 4.6 5 5.4 5.8   -3 -2 -1 0 1 2 3

std. dev. away from the mean
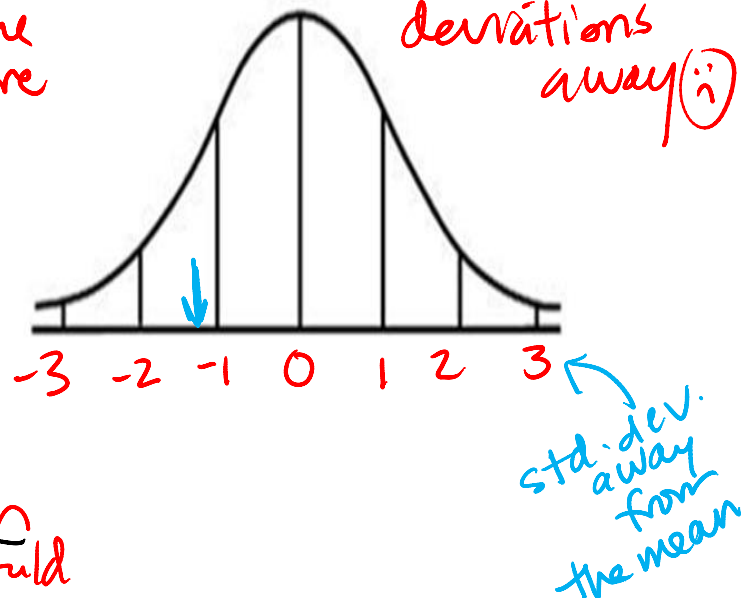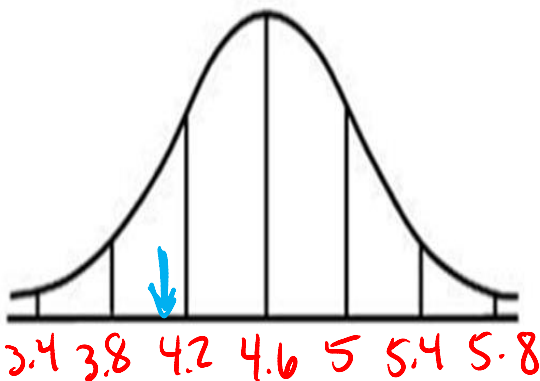
How to find a z score: We know that 4.2 is 1 standard deviation below so its z-score would be -1

⭐ $z = \dfrac{x - \mu}{\sigma}$

z-score for 4.1:

$z = \dfrac{4.1 - 4.6}{.4} = $ (-1.25)

How to use a z table:

Using a z-score of -1.25, located the decimal on the TABLE.
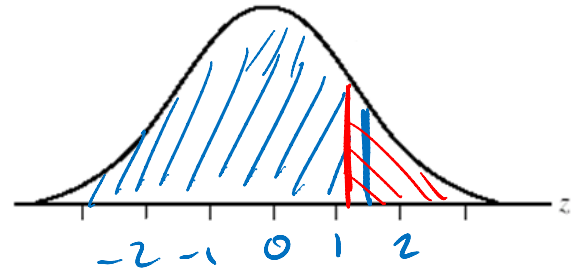
z-score of -1.25 = .1056

10.56% of flies have wing spans less than 4.1 mm

Ex. 1. A study finds that the weights of infants at birth are normally distributed with a mean of 3270 grams and a standard deviation of 600 grams. An infant is randomly chosen.

a. What is the probability that the infant weighs 4170 grams **or less**?

$$Z = \frac{4170-3270}{600} = 1.5$$

From table → $\boxed{.9332}$

b. What is the probability that the infant weighs 3990 grams **or more?** ✗

$$Z = \frac{3990-3270}{660} = 1.2$$

From table → .8849

✗ $1 - .8849 = \boxed{.1151}$

Ex. 2 Scientists conducted aerial surveys of a seal sanctuary and recorded the number x of seals they observed during each survey. The number of seals they observed were normally distributed with a mean of 73 seals and a standard deviation of 14.1 seals.

a. Find the probability that **less than** 50 seals were observed during a randomly chosen survey.

$$Z = \frac{50-73}{14.1} = -1.63$$

From table → $\boxed{.0516}$
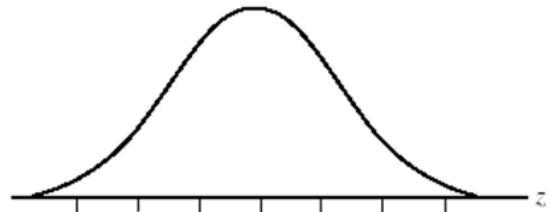
b. Find the probability that **more than** 88 seals were observed during a randomly chosen survey.

$$Z = \frac{88-73}{14.1} = 1.06$$

From table → .8554

✗ $1 - .8554 = \boxed{.1446}$