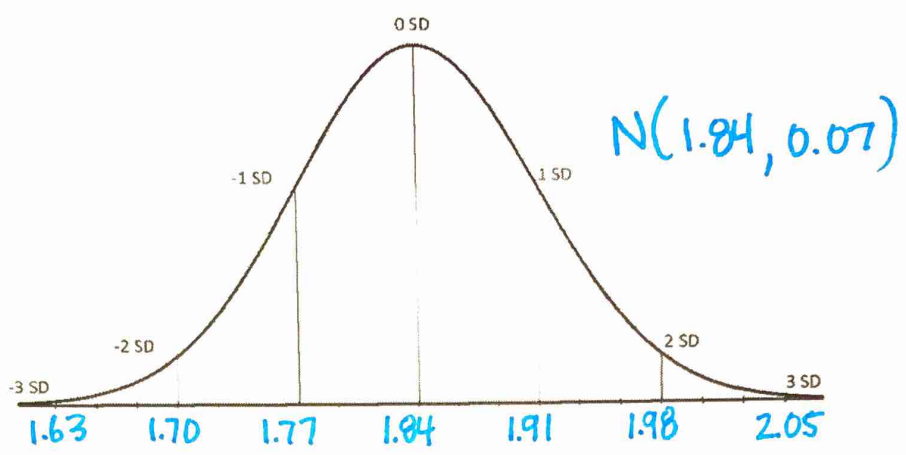


Intro Stats: Normal Distribution Calculations

Mr. Wilcox spends a full day at Gingerman Raceway testing some new tires on his Honda Civic. For 400 laps, he records his laptime in minutes. At the end of the day, he plots the distribution of times and realizes that it follows an approximately normal distribution with a mean of 1.84 and a standard deviation of 0.07.

1. Label the values 1, 2, and 3 standard deviations above and below the mean.



- 2. What percentage of the laptimes are less than 1.70 minutes? 2.5%
- 3. What percentage of the laptimes are greater than 1.77 minutes? 84%
- 4. What percentage of the laptimes are between 1.70 and 1.91 minutes? 81.5%
- 5. What laptime would be in the slowest 2.5% of all laptimes? 1.98 minutes or more

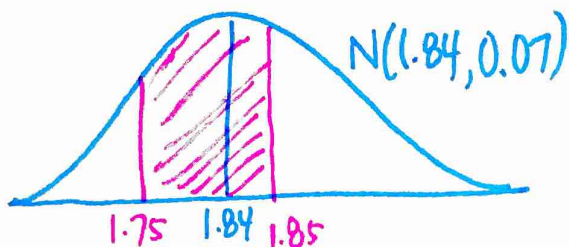
For problems #6-10, you must draw and label a picture, shade, calculate a z-score, and then answer the question.

6. In order to beat his friend Tom, Mr. Wilcox needs to have lap times that are less than 1.72 minutes. Find the proportion of laps that were less than 1.72 minutes.

$$z = \frac{x - \mu}{\sigma} = \frac{1.72 - 1.84}{0.07} = -1.71$$

$$\text{AREA} = \boxed{0.0436}$$

7. Mr. Wilcox would really like his laptimes to be consistently between 1.75 and 1.85 minutes. What proportion of his laps were in this range?



$$z = \frac{x - \mu}{\sigma} = \frac{1.75 - 1.84}{0.07} = -1.29$$

$$z = \frac{x - \mu}{\sigma} = \frac{1.85 - 1.84}{0.07} = 0.14$$

$$\text{AREA} = 0.5557 - 0.6985 = \boxed{0.4572}$$

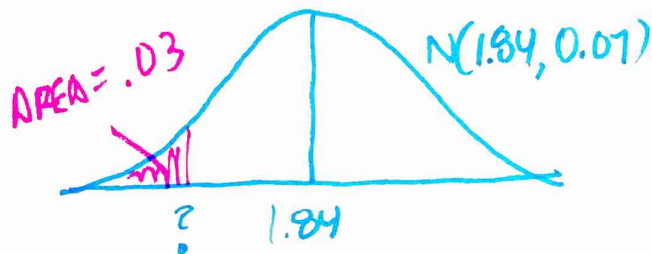
8. In what proportion of laptimes did it take Mr. Wilcox more than 2 minutes?



$$z = \frac{x - \mu}{\sigma} = \frac{2 - 1.84}{0.07} = 2.29$$

$$\text{AREA} = 1 - 0.9890 = \boxed{0.011}$$

9. What laptime is necessary for Mr. Wilcox to be in the fastest 3% of all his laps (remember a fast laptime is a low laptime)?



$z = -1.88$ has an area of .0301 (Table A)
so we are 1.88 standard deviations below the mean.

$$1.84 - 1.88(0.07) = \boxed{1.7084 \text{ minutes}}$$

10. Redo problems #6-9 using the Applet and record your answers here:

Question #6: 0.0432

Question #7: 0.4575

Question #8: 0.0111

Question #9: 1.7083