

The fuel economy for 2013 midsize cars was taken from

www.fueleconomy.gov

the official U.S. government source for fuel economy information

Summary Statistics:

Mean	25.3
St. Dev.	5.98
Min.	12
Q1	21
Median	24
Q3	29
Max	42

Suppose every midsize car had a fuel tank that held 12 gallons of gas and a reserve large enough to get you another 25 miles. For example, someone refueling 12 gallons of gas with fuel efficiency of 25 mpg would be able to drive $12(25) + 25 = 325$ miles. Show your work!!!

1. What is the mean miles per tank?

$$25.3(12) + 25 = 328.6 \text{ miles}$$

2. What is the standard deviation for the miles per tank?

$$5.98(12) = 71.76 \text{ miles}$$

3. What is the median miles per tank?

$$24(12) + 25 = 313 \text{ miles}$$

4. What is the IQR for the miles per tank?

$$\underset{Q_3}{29} - \underset{Q_1}{21} = 8$$

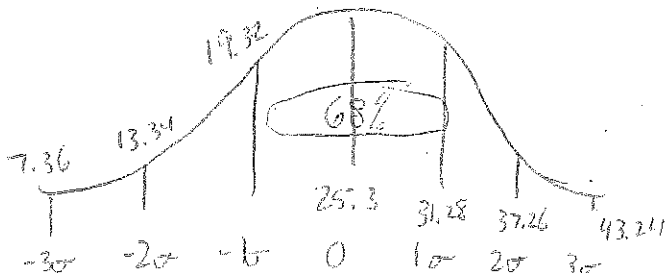
$$8 \times 12 = 96$$

5. Sarah's car gets 43 miles per gallon. Would you consider 43 miles per gallon to be unusually high? Explain.

$$z = \frac{43 - 25.3}{5.98} \quad z = 2.96$$

yes; its more than 2 stdev from mean!

6. Draw a normal model to represent the fuel economy. Include the mean and the standard deviations on the model.



68% btw 19.32 to 31.28
95% 13.34 37.26
99.7 7.36 43.24

Approx 99.85% ... much higher than others!

7. What percent of the data falls more than 1 standard deviation below the mean?



approx 16%

You are trying to decide on what car to buy and fuel efficiency and safety rating are your two top priorities. The mean for the top twelve ranked cars is 38.92 with a standard deviation of 1.62. The minimum mpg's for the lowest ranked car is 37.

	Mean	Standard Deviation
Fuel Efficiency	38.92 mpg	1.62

Safety ratings are based on a 6-Star scale with safer cars rating more stars. The mean rating for the same twelve cars as part A is 3.8 with a standard deviation of 1.2.

	Mean	Standard Deviation
Safety Rating	3.8 Stars	1.2

8. You consider fuel efficiency and safety to be of equal importance. Based on the previous information, which car should you select if you have narrowed your choice to the two below. Justify your answer.

	Honda Accord	Mazda 6
Fuel Efficiency	29 mpg	25 mpg
Safety Rating	4 stars	6 stars

Accord

Fuel $z = \frac{29 - 38.92}{1.62} = -6.12$

Safety

$z = \frac{4 - 3.8}{1.2} = .17$

Mazda

Fuel $z = \frac{25 - 38.92}{1.62} = -8.6$

Safety $z = \frac{6 - 3.8}{1.2} = 1.83$

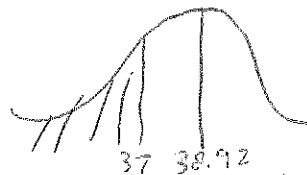
total $\frac{-6.12}{.17} = -5.95$ *Combine them*
 total $\frac{-8.6}{1.83} = -6.77$ *Better combined z-score w/ Accord*

9. If the data about cars were normal, what would you expect the minimum and maximum to be for fuel efficiency and safety stars?

Fuel: $38.92 \pm 2(1.62)$ max 42.16 min 35.68

Safety stars: $3.8 \pm 2(1.2)$ max 6.2 min 1.4

10. What proportion of cars have a fuel efficiency less than 37 mpg?

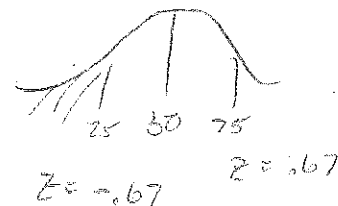
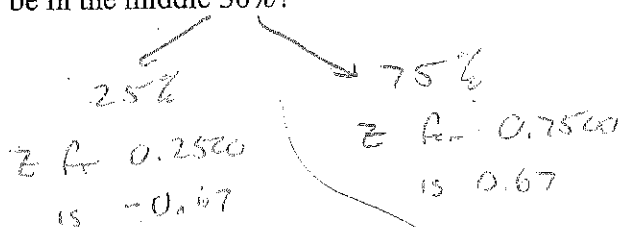


$z = \frac{37 - 38.92}{1.62} = -1.19$

on table $z = -1.19 \approx .1170$

$.1170 = 11.70\%$

11. Many colleges required you to have an ACT or SAT score ☺ One college has a mean ACT score of 20.8 with scores distributed normally. The STDEV is 4.8. What is the lowest and highest score you would need to get to be in the middle 50%?



$\frac{x - 20.8}{4.8} = -0.67$

Algebra
 $x = 17.58$

$\frac{x - 20.8}{4.8} = 0.67$

$x = 24.016$