

$$\begin{aligned} \text{midrange} &= \frac{\text{lowest value} + \text{highest value}}{2} & \text{range} &= \text{highest value} - \text{lowest value} \\ \bar{x} &= \frac{x_1 + x_2 + \cdots + x_n}{n} = \frac{\sum_i x_i}{n} = \frac{\sum_i x_i f_i}{n} & Z &= \frac{X - \bar{x}}{s} \\ s &= \sqrt{\frac{(x_1 - \bar{x})^2 + (x_2 - \bar{x})^2 + \cdots + (x_n - \bar{x})^2}{n - 1}} = \sqrt{\frac{\sum_i (x_i - \bar{x})^2}{n - 1}} = \sqrt{\frac{\sum_i f_i (x_i - \bar{x})^2}{n - 1}} \end{aligned}$$

1. (18pts) Over the course of two weeks (workdays only) DMV employee Jonathan counts the daily number of people coming to take the driving test. He gets the following numbers: 8, 7, 4, 11, 10, 9, 9, 10, 7, 6.

- Find the midrange.
- Find the median.
- Find the mean.
- Find the range.
- Find the standard deviation.

2. (8pts) A downtown beautification project is proposed for Murray's downtown, paid for by taxpayer money. To gauge support for the idea, city officials decide to do a survey of the city's population. Comment on whether each of the following methods will produce a good random sample of the city's population:

- Surveying passers-by on the court square.
- Surveying people who have come to see a basketball game at the CFSB center.
- Picking random names from the list of people who pay property taxes in Murray, and surveying them.
- Surveying patrons of Murray's Backyard Burger.

**3.** (25pts) A fashion magazine assistant editor does not want to repeat the clothes she wears too often and has her assistant keep track of how often she wore each of her garments over a period of time. The table below indicates how many times she wore those garments (she wore 18 garments once, 14 garments twice, etc.). Note that “times worn” is the data, the other numbers are frequencies.

- a) Draw a histogram for the data.
- b) Find the mode number of times worn.
- c) Find the median number of times worn.
- d) Find the mean number of times worn.
- e) Find the standard deviation.

Times worn	Frequency (garments)
1	18
2	14
3	10
4	17
5	6

**4.** (6pts) In a normal distribution with mean 15 and standard deviation 2.1, which data value is

- a) 2 standard deviations above the mean?
- b) 1.5 standard deviations below the mean?



7. (17pts) Systolic blood pressure readings are normally distributed with a mean of 121 and a standard deviation of 15. Draw a picture showing which area you are computing as you answer:

- a) What percentage of people have systolic blood pressure between 90 and 110?
- b) What percentage of people have systolic blood pressure higher than 140 (which is considered high blood pressure)?

**Bonus.** (10pts) A woman insists she will never marry a man shorter than she is, even though she knows only 20% of men fall into this category. If men's heights are normally distributed with mean 69 inches and standard deviation 2.5 inches, how tall is the woman? (*Hint: this problem is the reverse of what we usually do with a normal distribution. Here, the area is given: you have to find the  $z$ -score that this area corresponds to. You will also need to find the height corresponding to that  $z$ -score.*)