

Homework 01

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Question 1

A random sample of lunch budgets for Charlottesville adults.

```
budget <- c(12, 15, 20, 30, 10, 7, 10, 25, 18, 19, 28, 8)
```

Part A

```
mean_budget <- mean(budget)
print(mean_budget)
```

```
## [1] 16.83333
```

Part B

$$\begin{aligned} s^2 &= \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1} \\ &= (12 - 16.83)^2 + (15 - 16.83)^2 + (20 - 16.83)^2 + (30 - 16.83)^2 + (10 - 16.83)^2 + \\ &\quad (25 - 16.83)^2 + (18 - 16.83)^2 + (19 - 16.83)^2 + (28 - 16.83)^2 + (8 - 16.83)^2 + \\ &\quad (7 - 16.83)^2 + (10 - 16.83)^2 \\ &= \frac{675.6668}{11} \\ &= \underline{\underline{61.42}} \end{aligned}$$

```
variance_budget <- var(budget)
print(variance_budget)
```

```
## [1] 61.42424
```

Part C

The mean should be five times the amount of the mean in Part A because we are assuming they are spending the same everyday.

Part D

The variance should be 25 times the variance of the original sample.

Part E

If you multiply the mean by a constant c , it should be the original mean times c . If you multiply the variance by c , it should be the original variance times c squared.

Part F

The mean is the original mean plus 2. This is because the number of observations are the same so the calculation is essentially the same plus whatever the constant is.

Part G

The variance is the same because the distance of each observation from the mean is the same.

Part H

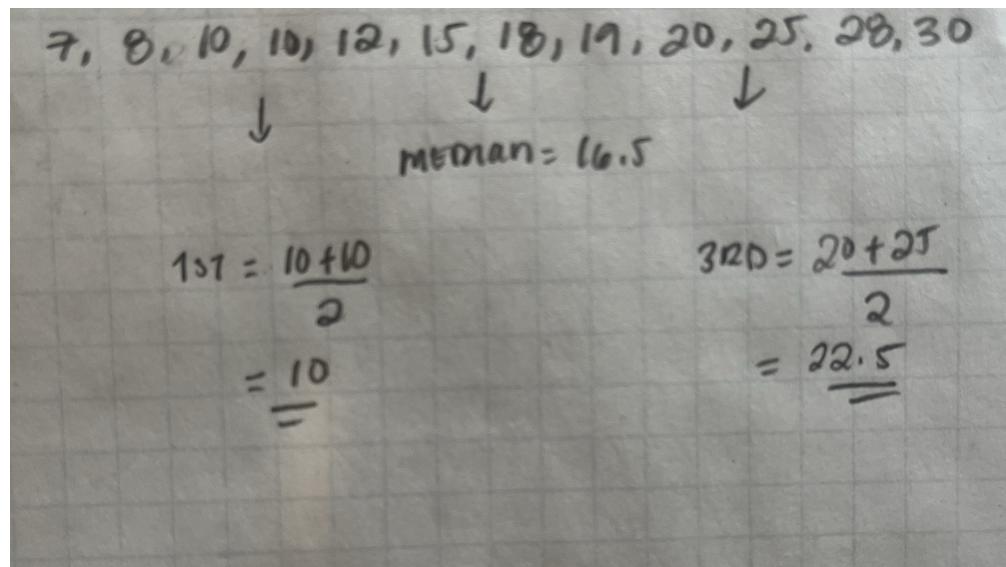
If you add c to the mean, it will be the mean plus c . If you add c to the variance, the variance will not change.

Question 2

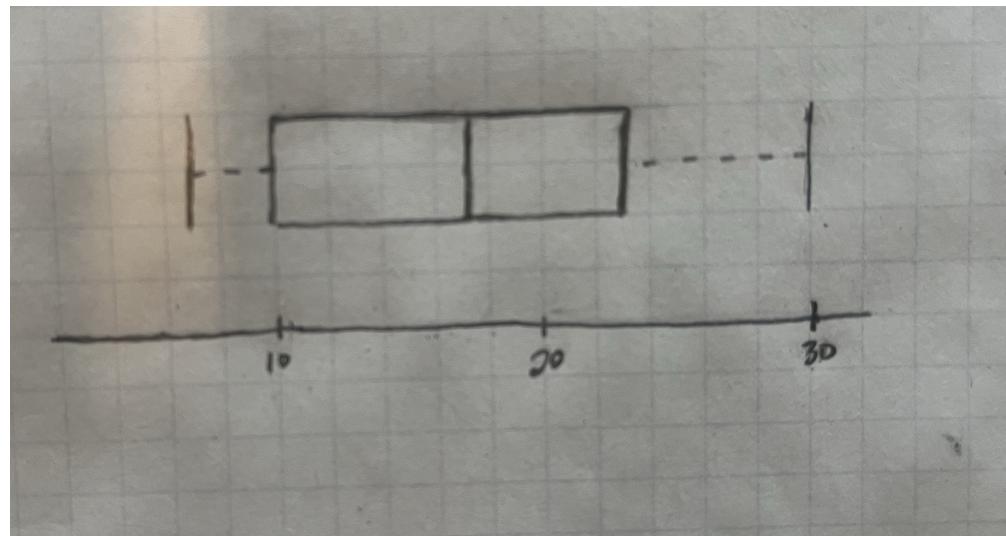
Part A

A handwritten calculation on grid paper showing the mean of the numbers 7, 8, 10, 10, 12, 15, 18, 19, 20, 25, 28, 30. The numbers are listed at the top, with 15 and 18 underlined. Below them, the expression $\frac{15+18}{2}$ is written. An equals sign follows, and then $\underline{\underline{16.5}}$ is shown, indicating the final answer.

Part B



Part C



Question 3

Part A

According to <https://www.statology.org/example-of-normal-distribution/>, the birthweight of babies are normally distributed.

Part B

According to <https://www.statology.org/positively-skewed-distribution-examples/>, individual income is right skewed. Most individuals make between \$20,000 and \$40,000 a year, but many make more.

Part C

Age of death is left skewed according to <https://www.statology.org/negatively-skewed-distribution-examples/>. People die when they are older.

Part D

I did my homework on my own.