# 9.2.5B What's my Salary?


*A Solidify Understanding Task*

Some companies advertise using medians, while other companies use averages or means, to encourage applicants to want to work for them. Let's investigate two companies.

**Sunshine Inc.** has the following salaries for their employees:

| | | |
|---|---|---|
| $20,000 | $23,000 | $37,000 |
| $20,000 | $24,000 | $37,000 |
| $20,000 | $30,000 | $150,000 |
| $21,000 | $30,000 | $580,000 |
| $22,000 | $32,000 | |
| $23,000 | $32,000 | |

**Rainbow LLC** has the following salaries for their employees:

| | | |
|---|---|---|
| $45,000 | $46,000 | $50,000 |
| $45,250 | $46,500 | $52,000 |
| $45,500 | $46,750 | $52,500 |

In the table below, record the five-number summary and IQR for each company.

| Statistic | Sunshine Inc. | Rainbow LLC. |
|---|---|---|
| Min | 20,000 | 45,000 |
| $Q_1$ | 21,500 | 45,375 |
| Median | 27,000 | 46,500 |
| $Q_3$ | 34,500 | 51,000 |
| Max | 580,000 | 52,500 |
| IQR | 13,000 | 5,625 |

# 9.2.5B

Calculate the mean and standard deviation for each company and record below.

| Statistic | Sunshine Inc. | Rainbow LLC. |
|---|---|---|
| $\bar{x}$ | 68,812.50 | 47,722.22 |
| $s_x$ | 139,876.72 | 2,961.85 |

Use the measures of center (median, mean) and spread (IQR, standard deviation) to explain which job would be best in terms of salary? Even though the mean of sunshine is higher, its outlier skews the data alot. Rainbow is much better.

Answers will vary. Look for students to compare data points and mention how the outliers of Sunshine impact these points.

When comparing the two data sets in context, which company would be better to begin employment with? Why?

Answers will vary. Look for students to mention that the min (starting) salary is better for Rainbow. even though potential final is high for sunshine.

Which company would you want to work for? How did the outliers influence your decision?

Answers will vary

When is it appropriate to use a mean to represent a center of data?

Answers will vary. Look for students to mention that mean is appropriate when there are no outliers.

READY, SET, GO! Name _____ Period _____ Date _____

## *READY*

Topic: Choosing a Data Display

The following data set shows the number of songs downloaded in one week by each student in Mrs. Jones class: 10, 20, 12, 14, 12, 27, 88, 2, 7, 30, 16, 16, 32, 25, 15, 4, 0, 15, 6, 1, 0, 15, 12, 10, and 7.

a. What are the summary statistics for the data?

Mean = 15.84
$S_x$ = 17.4635
Min = 0
$Q_1$ = 6.5
Med = 12
$Q_3$ = 18
Max = 88
IQR = 11.5

b. Construct two different graphs of the data.

Answers will vary. Appropriate graphs include dot plot, histogram, box and whisker

*This would be a good place to discuss how we choose a representation and why we don't graph these on a coordinate plan (univariate vs. bivariate data).

c. Describe the distribution of the data, citing both of the plots and the numerical summary statistics.

Answers will vary. Look for students to mention skew, outlier, why $S_x$ is appropriate, comparisons of mean vs. median and SD vs. IQR

d. What are the advantages to each data display? Explain.

Answers will vary

## *SET*

Topic: Effects of Outliers

1. The table to the right shows the length of a class period for each of the schools listed. If Green Road High, with a class period of length 110 minutes is added to the data, what effect would it have on the mean, median, standard deviation, and IQR? With Green Road High's data included, which measures of center and spread would be best to describe the data? Explain your choice.

| School | Length of Class (min) |
|---|---|
| Lakeview High | 50 |
| Center High | 70 |
| Oak Hill High | 75 |
| Fairside High | 60 |
| Jeffries High | 65 |
| Rodgers High | 65 |
| New Hill High | 60 |
| Sunnyville High | 55 |
| Pine Hill High | 65 |
| Greenville High | 70 |
| Faith High | 60 |

Before 110:
Mean = 63.1818
$S_x$ = 7.167
Min = 60
$Q_1$ = 60
Med = 65
$Q_3$ = 70
Max = 75
IQR = 10

After 110:
Mean = 67.0833
$S_x$ = 15.1445
Min = 60
$Q_1$ = 60
Med = 65
$Q_3$ = 70
Max = 110
IQR = 10

Look for students to mention increase in mean and standard deviation but no change in median and IQR. Student choice of center and spread may vary.

2. Below are the commission earnings for the employees of *Cars To Go* during the month of December:
$1120, $1380, $1250, $120, $3500, $1250, $1500, $1790, $1860

a. Find the measures of center. Mean = 1530; Median = 1380

b. Identify any outliers. How do the outliers affect the mean and median?
120 and 3500 are possible outliers; look for students to mention that since there is an outlier at both ends of the data, the mean was not as greatly affected as would be the case if there were only a high or only a low outlier.

c. Should the outliers be included when reporting the average commission earned? Explain. Answers will vary

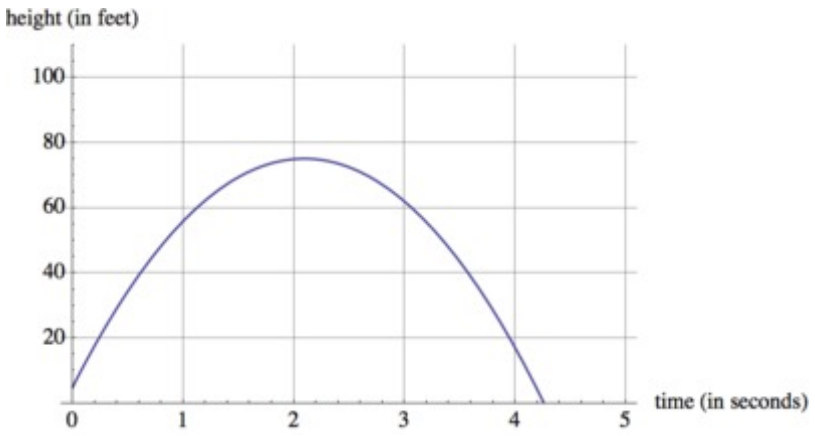
*Go!*

Topic: Features of Quadratic Graphs

1. Without using a graphing calculator, sketch the graph of $f(x) = x^2 + 7x + 10$ and identify the x-intercepts, y-intercept, and the maximum or minimum point.

   X –int: (-2, 0), (-5, 0) y-int: (0, 10) min: y = -2.25

2. Suppose Brett and Andre each throws a baseball into the air. The height of Brett's baseball is given by $h(t) = -16t^2 + 79t + 6$, where $h$ is in feet and $t$ is in seconds. The height of Andre's baseball is given by the graph below:




Brett claims that his baseball went higher than Andre's, and Andre says that his baseball went higher.

a) Who is right? Explain.
   Brett's ball's height is approx. 103.5; Andre's ball's height is around 75
   Brett is right

b) How long is each baseball airborne?
   Brett: approx. 5 sec Andre: about 4.25 sec

c) Construct a graph of the height of Brett's throw as a function of time on the same set of axes as the graph of Andre's throw (if not done already), and explain how this can confirm your claims to parts (a) and (b).
   See graphs