

Warm-up

1. Janet has 2 quarters, 3 dimes and 6 nickels in her pocket. How many ways could she arrange the coins?

$$\frac{11!}{2!3!6!} = 4620$$

2. On a loaded die there is a  $\frac{2}{7}$  chance of rolling a 5. What is the probability of rolling exactly 4 fives on the next 10 rolls?

$$\text{binompdf}(10, \frac{2}{7}, 4) = 0.1859$$

3. A group of 10 friends are gathered around a campfire, in how many ways could they be arranged?

$$\frac{10!}{10} = 362,880$$

Warm-up continued

4. A store sells T-shirts in 7 colors, 5 designs, and 3 sizes. How many different T-shirts are available?

$$7 \cdot 5 \cdot 3 = 105$$

5. Marva needs to mow the lawn, pay her bills, walk the dog, and return a phone call. How many ways can she choose to order her tasks?

$$4! = 4 \cdot 3 \cdot 2 \cdot 1 = 4P_4 = 24$$

6. John has a  $\frac{2}{3}$  chance of getting a new job offer. He has a  $\frac{3}{4}$  chance of getting offered a raise and a  $\frac{3}{5}$  chance of both. What is the probability of getting offered a raise if he was just offered the new job?

$$\frac{\text{Both}}{\text{Known}} = \frac{\frac{3}{5}}{\frac{2}{3}} = \frac{9}{10}$$

**Middletown Snowboards**

304, 328, 335, 345, 356, 360, 375, 405, 448

**Snowboard Central**

329, 343, 370, 386, 392, 395, 402, 420, 432

a) Identify the 6 main statistics of each set of data.

<u>Middletown Snowboards</u>			<u>Snowboard Central</u>		
Mean:	<b><u>361.78</u></b>	Range: <b><u>144</u></b>	Mean:	<b><u>385.44</u></b>	Range: <b><u>103</u></b>
Median:	<b><u>356</u></b>	IQR: <b><u>58.5</u></b>	Median:	<b><u>392</u></b>	IQR: <b><u>54.5</u></b>
Mode:	<b><u>none</u></b>	S.D.: <b><u>40.81</u></b>	Mode:	<b><u>none</u></b>	S.D.: <b><u>31.62</u></b>

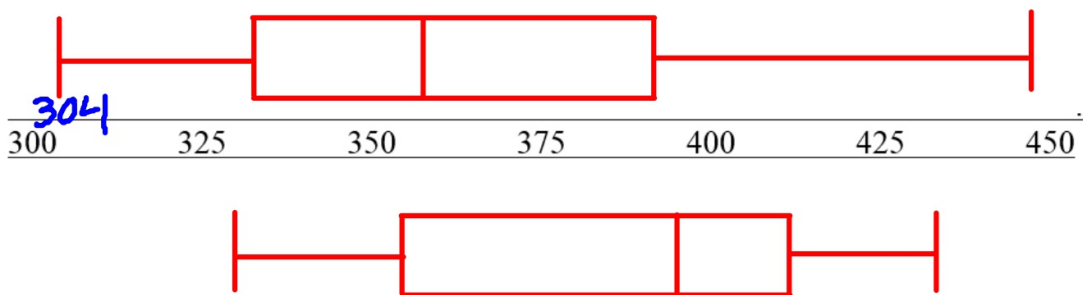
**Middletown Snowboards**

304, 328, 335, 345, 356, 360, 375, 405, 448

**Snowboard Central**

329, 343, 370, 386, 392, 395, 402, 420, 432

b) Draw a double box-and-whisker plot (one above / one below) for the above data on the scale below:



**Middletown Snowboards**

304, 328, 335, 345, 356, 360, 375, 405, 448

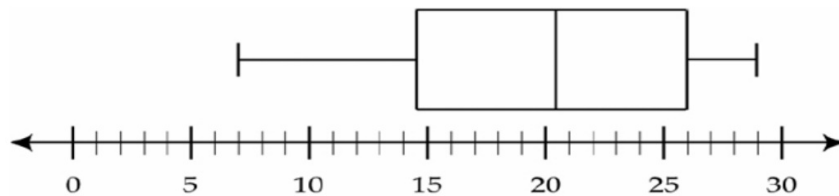
**Snowboard Central**

329, 343, 370, 386, 392, 395, 402, 420, 432

- c) What is the lowest price you could pay for a snowboard at Snowboard Central? 329
- What is the most expensive board at Middletown Snowboards? 448
- What is the range of prices for snowboards at Snowboard Central? 103
- Which price represents the 75<sup>th</sup> percentile for Middletown Snowboards? 390
- What is the lower quartile for Snowboard Central? 356.5
- If the stores sell the same boards, which store has the better overall prices? Explain.

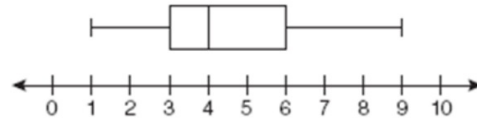
**Middletown; overall lower prices**

2) The accompanying box-and-whisker plot represents the cost, in dollars, of twelve CD's.



- a) Which cost is the upper quartile? \$26
- b) What is the range of the costs of the CD's? \$22
- c) What is the median? \$20.50
- d) What is the mean? ????
- e) Which cost represents the 100<sup>th</sup> percentile? \$29
- f) How many CD's cost between \$14.50 and \$26.00? 6 CDs
- g) How many CD's cost less than \$14.50? 3 CDs

6) A movie theater recorded the number of tickets sold daily for a popular movie during the month of June. The box-and-whisker plot shown below represents the data for the number of tickets sold, in hundreds.



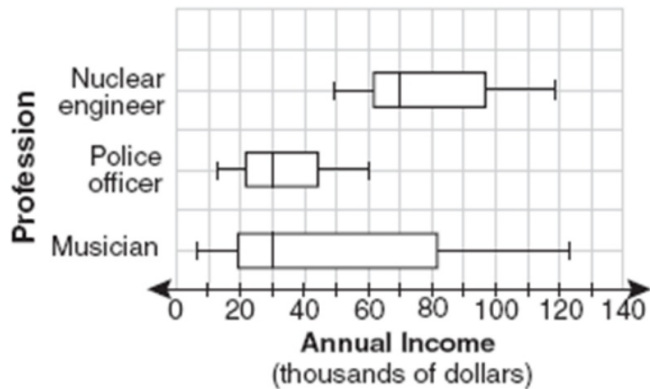
Which conclusion can be made using this plot?

- (A) The second quartile is 600.
- (B) The mean of the attendance is 400.
- (C) The range of the attendance is 300 to 600.
- (D) Twenty-five percent of the attendance is between 300 and 400.

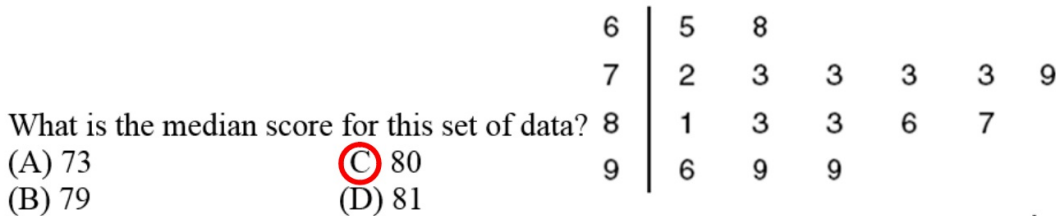
7) The accompanying box-and-whisker plots can be used to compare the annual incomes of three professions.

Based on the box plots, which statement is true?

- (A) The median income for engineers is greater than the income of all musicians
- (B) The median income for police officers and musicians is the same
- (C) All engineers earn more than all police officers
- (D) A musician will eventually earn more than a police officer

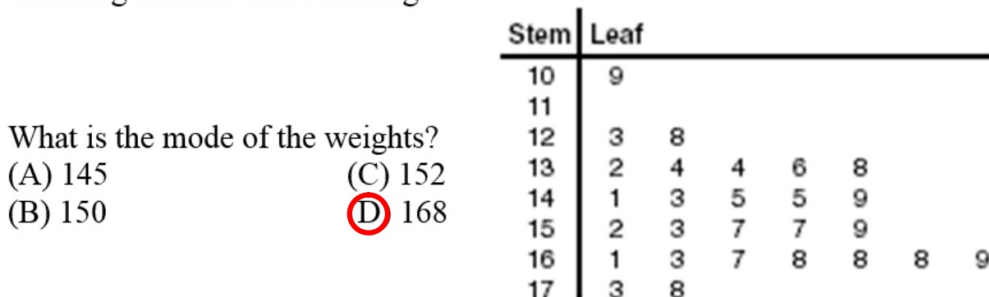


9) The accompanying stem-and-leaf plot represents Ben's test scores this year.



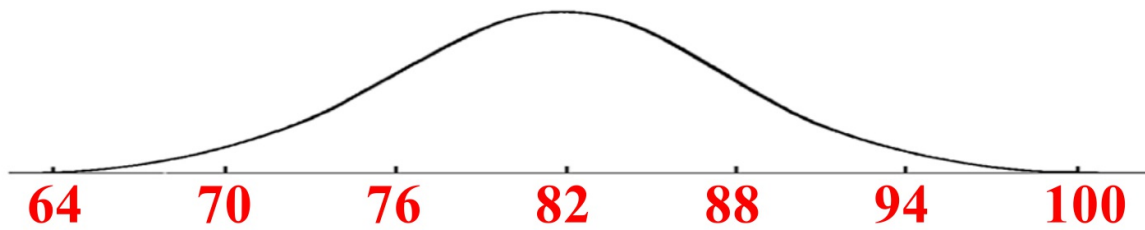
Key: 7 | 2 = 72

10) Jorge made the accompanying stem-and-leaf plot of the weights, in pounds, of each member of the wrestling team he was coaching.



## Normal Distributions

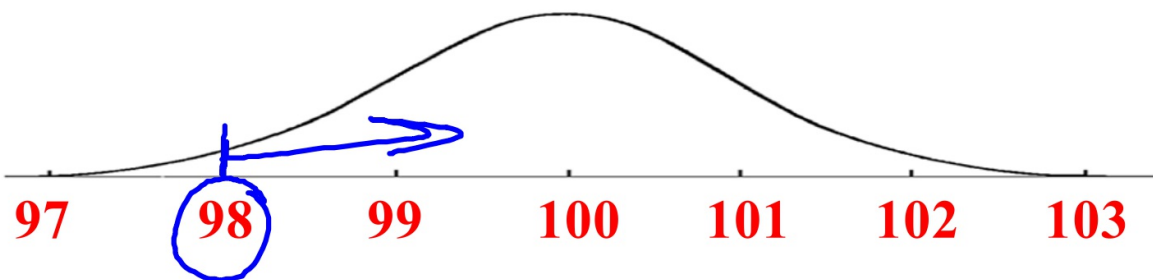
11) Coach Davis gives a test to 200. The grades are normally distributed with a mean of 82 and a standard deviation of 6. Label the distribution curve and answer the following questions:



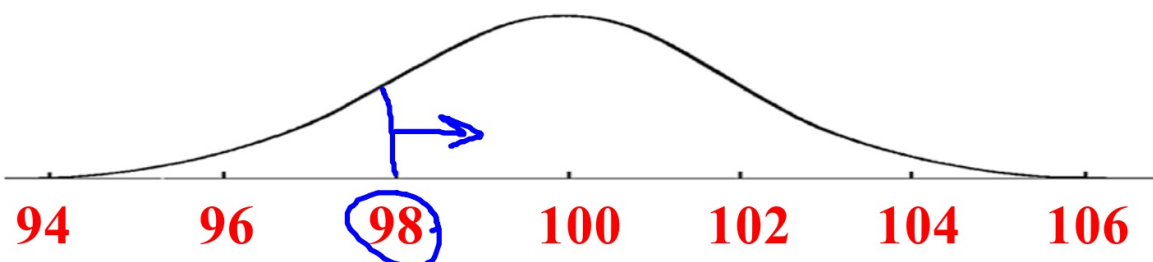
- |    |  |                     |
|----|--|---------------------|
| a. | What percent of students scored a 70 or higher?      | <u>97.5%</u>        |
| b. | What percent of students scored between a 76 and 88? | <u>68%</u>          |
| c. | What percent of students scored over a 100?          | <u>0.15%</u>        |
| d. | How many students scored above an 88?                | <u>32 students</u>  |
| e. | How many students scored between a 70 and 94?        | <u>190 students</u> |
| f. | How many students scored between an 82 and 88?       | <u>68 students</u>  |

12) Dunder Mifflin begins selling boxes of 100 paperclips. They have developed two methods of production, both methods are normally distributed:

Jim's Method – mean of 100, standard deviation of 1 paperclip and makes 40 boxes per hour



Dwight's Method – mean of 100, S.D. of 2 paperclips and makes 60 boxes per hour



After the boxes are made another machine weighs to verify that the box contains 100 paperclips. The company is only able to sell the boxes if they have at least 98 paperclips, any boxes filled with less are emptied. The company makes \$0.25 profit per box and any over filled boxes cost the company \$0.10 to empty and refill.

- a. What percent of Jim's boxes will be able to be sold? 97.5%  $\cdot 40$
- b. What percent of Dwight's boxes will be able to be sold? 84%  $\cdot 60$
- c. How many boxes would Jim be able to sell per hour? 39 boxes
- d. How many boxes would Dwight be able to sell per hour? 50 boxes
- e. What would Jim's profit per hour be?  $39(0.25) - 1(0.1)$  \$9.65
- f. What would Dwight's profit per hour be?  $50(0.25) - 10(0.1)$  \$11.64
- g. Which method should Dunder Mifflin use? Dwight's

# Review

## 6 Basic Measures for Statistics

3 Measures of Central Tendency – Mean / Median / Mode

3 Measures of Spread – Range / IQR / S.D.

Know when measures fit better than others

**Outliers** – how to find, what they affect more

## 5 Number Summary

↪ Min – Q1 – Med – Q3 – Max

## Box Plots

Make / Label

Know %s

How many...

Compare

Skew

25

## Distribution Curves

Make / Label

Know %s

How many...

## Sampling Methods:

Random -

Systematic -

Convenience -

Self-Selected

**Bias** -

# Time to Race

**Your group will get a slip with questions. When you finish the questions bring it back up to me.**

**If you have mistakes you will take it back to your group for corrections.**

**When everything is correct you will get the next slip of questions.**

**Make it all the way through for 2 bonus points on the test. First teams through will get more points.**



Team # \_\_

Find the 6 basic measures for the data set: {35, 45, 48, 52, 56, 56, 56, 61, 67}

Mean

Median

Mode

SD

Range

IQR

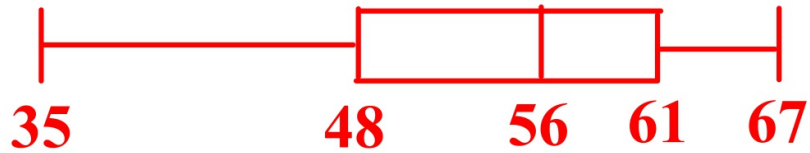
Team # \_\_

Create a box plot for the data set: {35, 45, 48, 52, 56, 56, 56, 61, 67}



Does the set have an outlier?

Is the box plot skewed? If so, how



Team # \_\_

What percent are below 56?

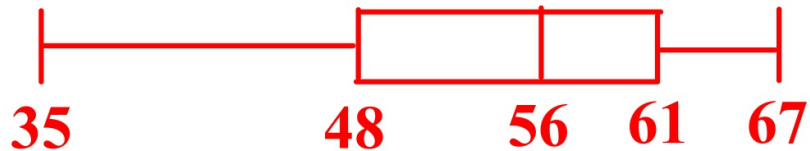
What percent are above 61?

What percent are between 48 and 61?

What percent are above 48?

What percent are below 35?





Team # \_\_

How many are above 48?

How many are below 67?

How many are between 48 and 61?

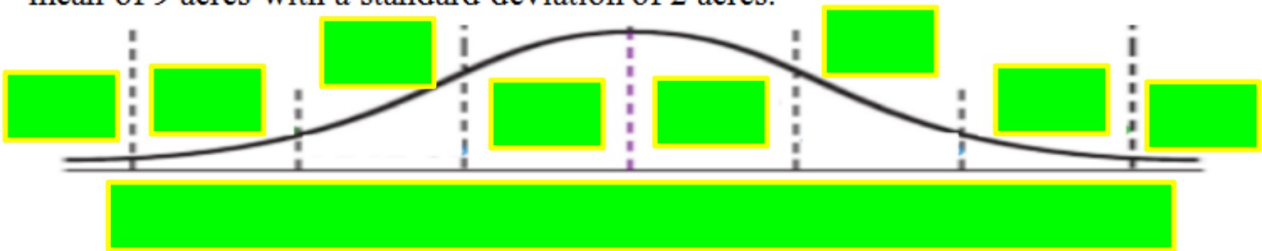
How many are below 56?



**300 people**

Team # \_\_

The acreage of properties in a farming community are normally distributed with a mean of 9 acres with a standard deviation of 2 acres.



Label the curve with the appropriate values and percentages between those marks.

Team # \_\_

What percent of farms have more than 13 acres?

What percent of farms have less than 11 acres?

What percent of farms are between 5 and 9 acres?

What percent of farms are between 9 and 15 acres?

What percent of farms are below 3 acres?

Team # \_\_

How many farms have between 11 and 15 acres?

How many farms have above 7 acres?

How many farms have below 15 acres?

How many farms have between 7 and 11 acres?

How many farms have between 3 and 13 acres?

# 5000 farms

Team # \_\_

Match samples as convenience, self-selected, systematic or random:

A counselor asks for volunteers to complete a survey about the efficiency of the counseling services.

A teacher keeps a hat filled with every student's name in it. He decides to poll the class's understanding of a lesson by selecting names from the hat to answer questions.

A student is conducting a poll on shopping preferences so she waits outside a mall and asks everyone coming out to answer a few questions.

A website automatically asks every 10<sup>th</sup> person to complete a survey about the site.

Team # \_\_

Henry is doing a project where he has to ask other students in the school about their opinions on new policies; so he asks his football teammates the questions. How could bias be found in his method?

**Answers vary**

Which sampling method in general do you think has the most bias? Why?

**Answers vary**

Team # \_\_

Ginger has an assortment of rose bushes that she is planting. She has 5 red, 6 white, 3 yellow and 3 pink; how many ways could she arrange the bushes?

8 employees are gathered around a conference table. How many ways could they be arranged?

Mallory is ordering dinner; she has 5 drink options, 4 appetizers, 6 entrees and 3 desserts to choose from. If she wants one of each, how many meal options does she have?

6 families are moving into a circular court with one road leading into it. How many ways could the families be arranged in those houses?

Team # \_\_

How many ways could 4 movies be chosen from a list of 16?

[Redacted]

How many ways could 8 people be arranged in a checkout line?

[Redacted]

How many ways could 3 officials be elected from 9 if each has a different job?

How many ways could 3 officials be elected from 9 if they have the same job?

[Redacted]

[Redacted]

Team # \_\_

A box contains 4 red balls, 5 blue cubes, 6 green cubes and 5 red cubes.

What is the probability of selecting a red object?

[Redacted]

What is the probability of selecting a cube then a ball?

[Redacted]

What is the probability that an object selected is red, given that it is a cube?

[Redacted]

What is the probability that 10 are selected (replaced) and you get exactly 4 green cubes?

[Redacted]

**Remember to Finish  
the TASK. Test grade!**