Football Statistics

In 2004 Cory Bradford was a receiver for the Texans. He received the ball in 12 out of the 16 games played by the team. The total yards received during each of the first 10 games are shown below.

24 9 52 32 5 52 27 13 65 38

If Cory Bradford's mean, median and mode for receptions during the first 7 games were 31, 24, and 52 (when rounded to the nearest whole number), which of the above yardages represents his stats?

1. Use the spreadsheet document to help you find the yards received by Cory Bradford during the first 7 games. Follow the instructions on the spreadsheet given in each of the colored boxes.

2. If the yards from the other 3 games were included in the data set, how would you predict
   a. the mean would change?

   b. the median would change?

   c. the mode would change?

3. Use the spreadsheet to calculate the mean, median, and mode for all 10 games. Set up a table beside or below the existing information.

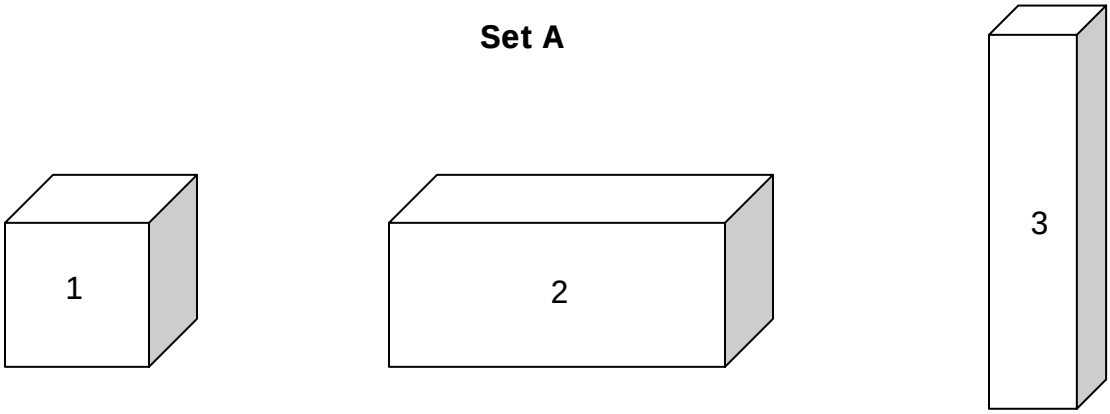
4. How close were your predictions to the actual mean, median and mode? Explain similarities and differences.

5. Print the file when finished. Be sure to ask your teacher for any special directions before printing.

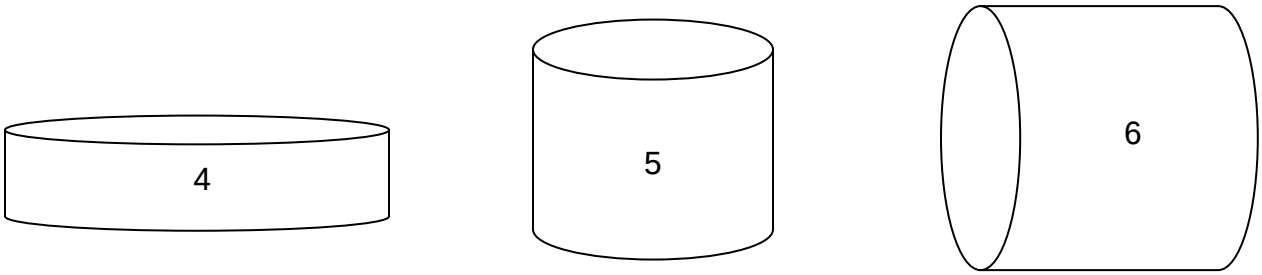
How Do These Shapes Measure Up?

1. Look at each set of figures below. Make a prediction about the mean, median, and mode for the heights of each set. For which set of data do you predict the mean, median and mode to be the same? Which set do you predict to have the greatest mean? Which set do you predict to have the smallest mean?

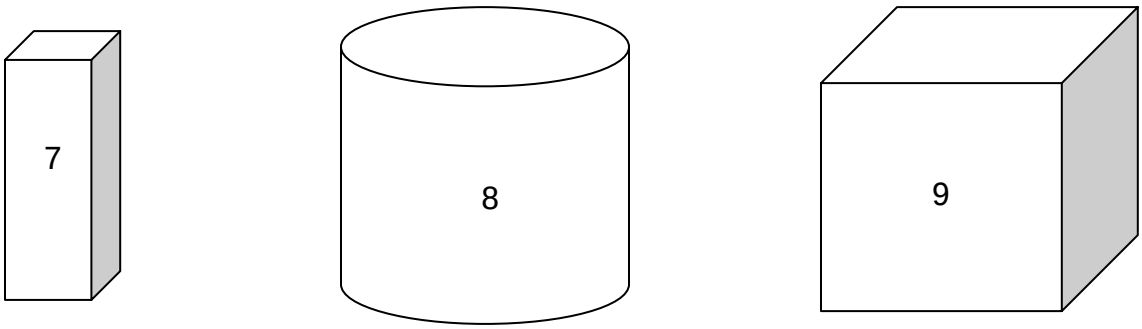
Set A



Set B



Set C



2. Measure the height of each figure. Round measurements to the nearest $\frac{1}{4}$ inch.
3. Use the spreadsheet document to
   a. organize data.
   b. find the mean, median and mode using formulas for the heights of each set.
   c. chart the mean, median and mode for the heights of each set.
4. Use the information to answer the following questions.

   d. Which set of figures has the same mean, median and mode?

   e. Which set has no mode?

   f. Which set has the same median and mode?

   g. Which data set has the greatest mean?

   h. Which data set has the smallest mean?

   i. How can looking at the figures help you determine the central tendencies?

   j. How would combining the data sets affect the mean? The median? The mode?

      mean –

      median –

      mode –

5. How different do you think the data sets would be if you measured the lengths or diameters of the figures? What would be similar? What would be different? Explain your reasoning.

6. Create a new table to the side of the current spreadsheet in order to find the mean, median, and mode of the lengths or diameters for each set of figures. Be sure to round measurements to the nearest $\frac{1}{4}$ inch. Chart the data.

7. Print the file when finished. Be sure to ask your teacher for any special directions before printing.

Data Mix-Up

Mr. Tucker gave his students the following data from the 2004 football season.

The Houston Texans played 16 games in 2004. The numbers in the table represent the total passing yards by David Carr, the quarterback, for each game.

229	215
313	164
233	201
228	157
372	167
266	220
276	139
245	114

Each student had to create a data set of passing yards for the losing games and a data set of passing yards for the winning games using the clues provided.

Clue 1: The Texans had 2 fewer wins in 2004 than losses.
Clue 2: The mean passing yards for the losing data set is less than the mean passing yards for the winning data set.
Clue 3: All of the passing yard totals for the winning games are in the same hundreds group except for 1.
Clue 4: The range for the passing yards of the losing games is 258 and of the winning games is in the one hundred range.
Clue 5: The smallest value in both data sets is in the one hundred range.

The data sets for 2 students are shown below.

Marissa	
Losses	Wins
313	372
276	266
245	233
229	228
215	220
167	201
164	114
157	
139	

Sheldon	
Losses	Wins
372	276
313	266
245	233
229	228
215	220
167	201
164	139
157	
114	

Use the clues and a spreadsheet to make your own data set. Find the mean, median and mode using formulas for each of your data sets. Compare your results to the given student results to decide which student is correct. Justify your reasoning.

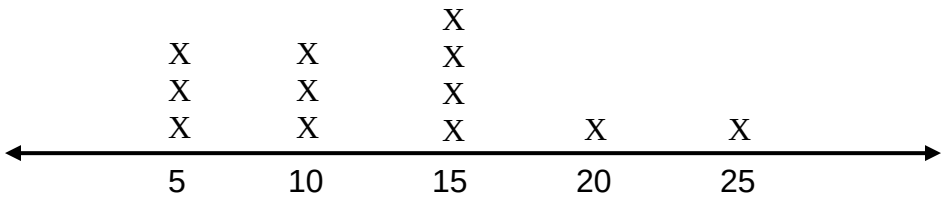
1. The table shows the number of points Menu scored during the first 5 basketball games.

Game	Points Scored
1	15
2	11
3	18
4	12
5	29

If Menu wants to predict how many points he will score during the next game, which measure of the data should he use?

A Mean
B Median
C Mode
D Range

2. Mai charges $5 per hour for babysitting. She decided to chart the amount she earned on different evenings spent babysitting during the past month.



What was the median amount she earned during the month?

A $10
B $12.50
C $14
D $15

3. In his first three hours of waiting tables, Kimiko received the following tip amounts.

$2 $1.50 $2 $3.25 $5 $2.25 $12

If Kimiko wants to ask for a raise by showing his tips are not very good, which measure of central tendency should he show his boss?

A Mean
B Median
C Mode
D Range

4. To participate in an activity at the Fall Festival or purchase food items, tickets must be purchased. Below is a table that describes some booths and food items at the Fall Festival and the number of tickets needed for that booth.

Activity or Food Item	Number of Tickets
Cake Walk	3
Fishing	2
Moon Walk	4
Pony Ride	6
Ring Toss	2
Rock Climbing	7
Chips	3
Drinks	3
Hot Dogs	5
Nachos	5

If a petting zoo is added to the list above, how many tickets should the Festival organizers assigned to the petting zoo for the mean to stay the same?

A 3
B 3.5
C 4
D 5

Football Statistics

In 2004 Cory Bradford was a receiver for the Texans. He received the ball in 12 out of the 16 games played by the team. The total yards received during each of the first 10 games is shown below, but the yards are not listed in a particular order.

24 9 52 32 5 52 27 13 65 38

If Cory Bradford's mean, median and mode for receptions during the first 7 games were 31, 24, and 52 (when rounded to the nearest whole number), which of the above yardages represents his stats?

1. Make a prediction for the yards received in the first 7 games. Justify your reasoning.

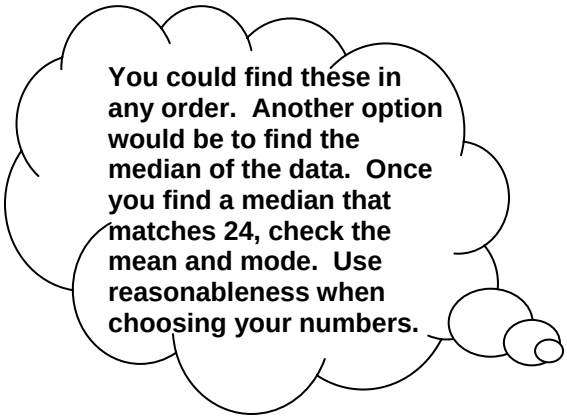
2. Use the TI-73 calculator and the given information to help you find the yards received by Cory Bradford during the first 7 games. Follow the instructions below.
   a. Input the data using the **LIST** feature.
      Press [LIST].
      Input the 7 yards one by one into L_1.
      Press [2nd][MODE] to return to the home screen.

   b. Find the mean of the data using the **STAT** feature. Record your trials in the table on the next page.
      Press [2nd][LIST] to access the STAT menu.
      Press [▶] to arrow over to MATH.
      Press [▼] to arrow down to mean(
      Press [ENTER].
      Press [2nd][LIST] L_1 [ENTER].
      Press [ENTER].

Think strategically when choosing the 7 yards. If the 7 yards chosen doesn't yield 31, go back to the list and modify it. Find the mean again for the new list.

	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9
1									
2									
3									
4									
5									
6									
7									
mean									

c. Once you get 31 for the mean of a data set, check the median and mode.



To check the median:

Press 2nd LIST to access the STAT menu.
Press ▶ to arrow over to MATH.
Press ▼ to arrow down to median(
Press ENTER.
Press 2nd LIST L_1 ENTER.
Press ENTER.

To check the mode:

Press 2nd LIST to access the STAT menu.
Press ▶ to arrow over to MATH.
Press ▼ to arrow down to mode(
Press ENTER.
Press 2nd LIST L_1 ENTER.
Press ENTER.

d. Record the yards for the first 7 games below.

e. How many trials did it take before finding the yards for the 7 games?

f. What strategies did you use to help you choose the numbers for each trial?

3. If the yards from the other 3 games were included in the data set, how would you predict
   a. the mean would change?

   b. the median would change?

   c. the mode would change?

4. Use the TI-73 to calculate the mean, median, and mode for all 10 games. Record below.

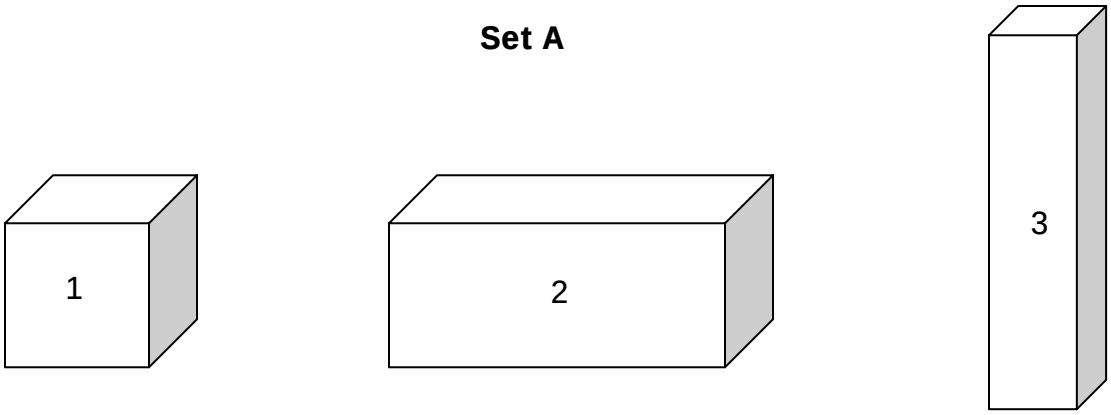
   Mean _____ Median _____ Mode _____

5. How close were your predictions to the actual mean, median and mode? Explain similarities and differences.

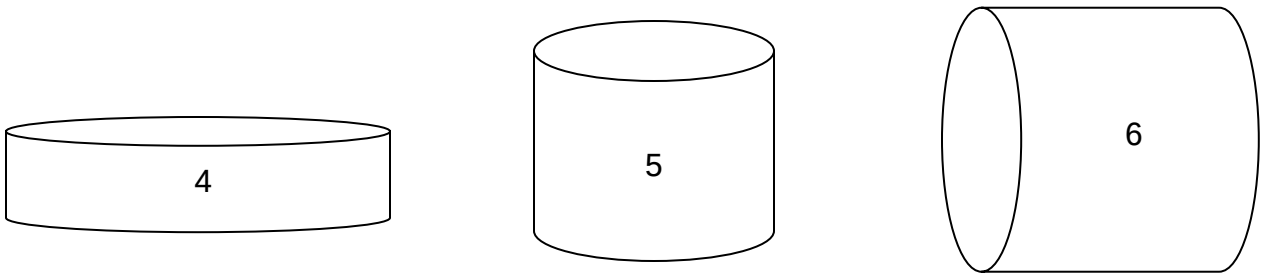
How do these shapes measure up?

1. Look at each set of figures below. Make a prediction about the mean, median, and mode for the heights of each set. For which set of data do you predict the mean, median and mode to be the same? Which set do you predict to have the greatest mean? Which set do you predict to have the smallest mean?

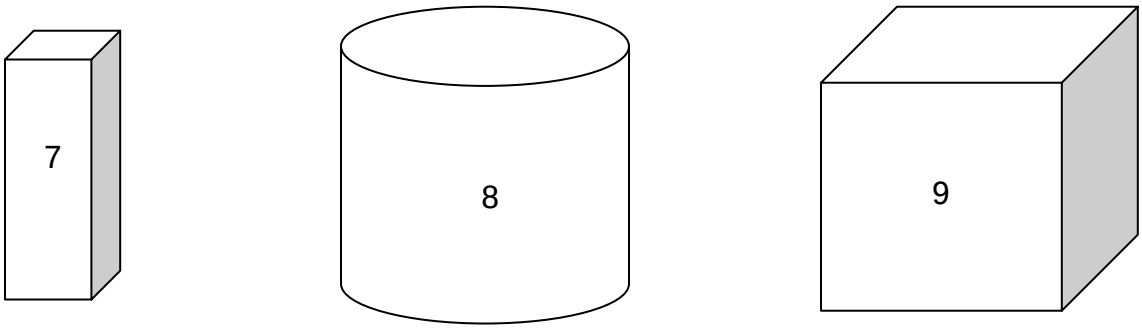
Set A



Set B



Set C



2. Measure the height of each figure. Round measurements to the nearest $\frac{1}{4}$ inch.

   Record in the chart under #4.

3. Input the height data for each set of figures using the **LIST** feature.
   Set A – L_1 Set B – L_2 Set C – L_3

4. Find the mean, median, and mode for each set of heights. Record data in the chart.

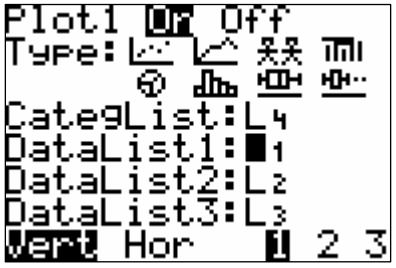
Set A	Height
1	
2	
3	
Mean	
Median	
Mode	

Set B	Height
4	
5	
6	
Mean	
Median	
Mode	

Set C	Height
7	
8	
9	
Mean	
Median	
Mode	

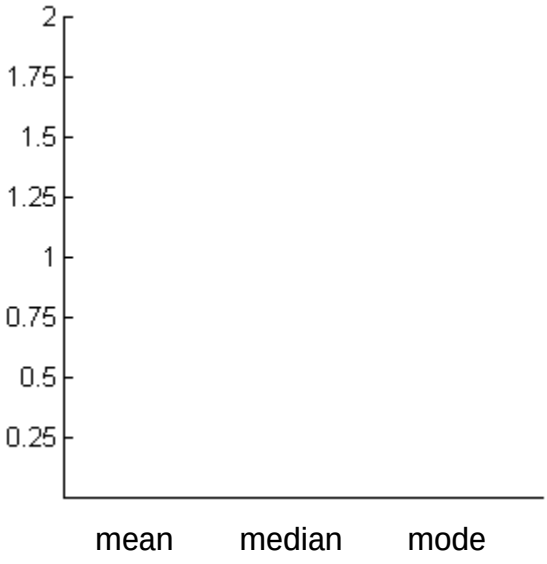
5. Input the mean, median and mode for each set of data using the **LIST** feature.
   Set A – L_4 Set B – L_5 Set C – L_6

6. Create a bar graph for the mean, median and mode of each set of heights. Sketch what you see.
   For each set:
   Press [2nd][Y=][ENTER].
   With the cursor blinking on ON, press [ENTER].
   Press [▼] to arrow down to the next row. Press [▶] to arrow over to (the bar graph). Press [ENTER].
   Since the measures of central tendency for Set A were in L_4, choose L_4 for the CategList. To do this, press [▼] to arrow down to the CategList row. Press [2nd][LIST] and select L_4. Press [ENTER].
   Your screen should look like this:

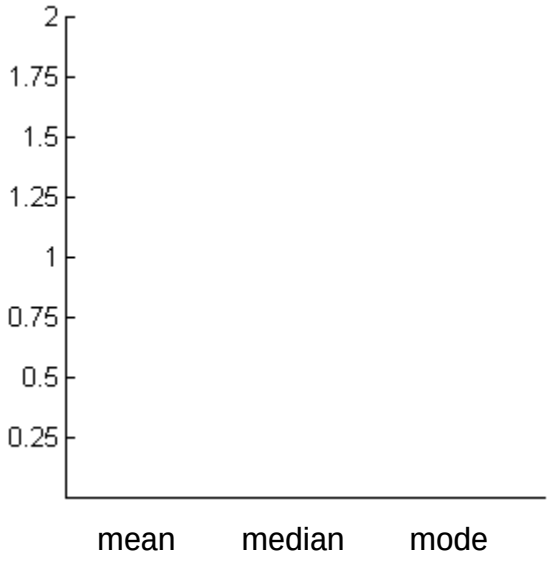


   Press [ZOOM] and arrow down to ZoomStat to see the graph.
   Sketch your graph on the next page. Repeat the process for Sets B and C.

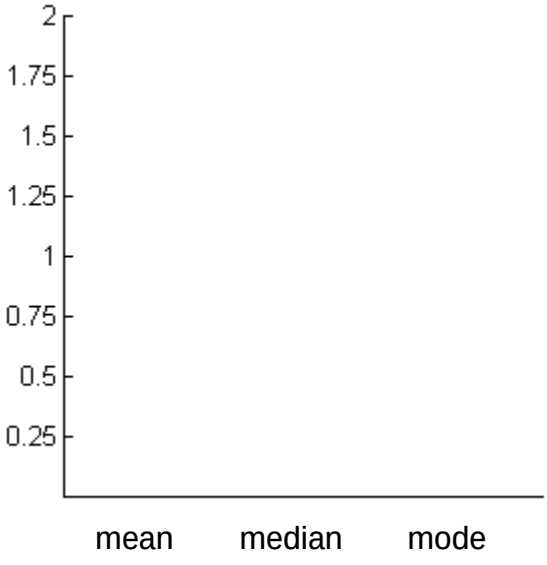
Set A



Set B



Set C



7. Use the information to answer the following questions.

    a. Which set of figures has the same mean, median and mode?

    b. Which set has no mode?

    c. Which set has the same median and mode?

d. Which data set has the greatest mean?

e. Which data set has the smallest mean?

f. How can looking at the figures help you determine the central tendencies?

g. How would combining the data sets affect the mean? The median? The mode?

mean –

median –

mode –

8. How different do you think the data sets would be if you measured the lengths or diameters of the figures? What would be similar? What would be different? Explain your reasoning.

9. Measure the lengths or diameters for each set of figures. Be sure to round measurements to the nearest $\frac{1}{4}$ inch. Record in the chart under #10.

10. Input the length/diameter data for each set of figures using the **LIST** feature.
Set A – L_1 Set B – L_2 Set C – L_3
Find the mean, median, and mode. Record data in the chart.

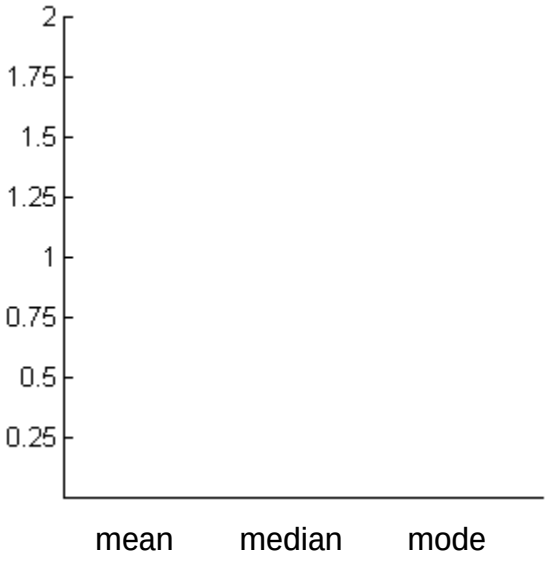
Set A	Length/ Diameter
1	
2	
3	
Mean	
Median	
Mode	

Set B	Length/ Diameter
4	
5	
6	
Mean	
Median	
Mode	

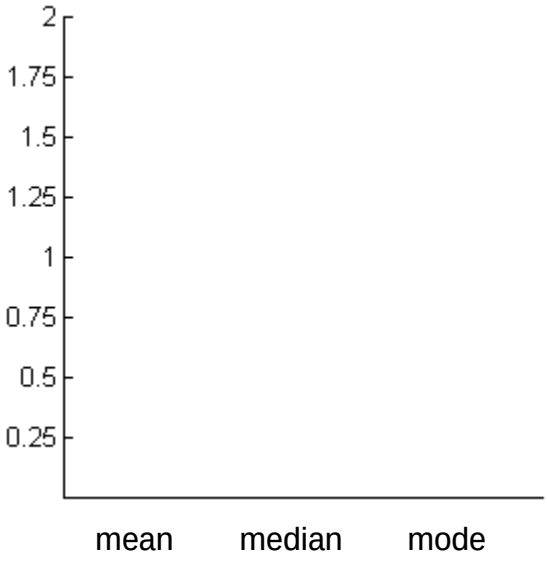
Set C	Length/ Diameter
7	
8	
9	
Mean	
Median	
Mode	

11. Create a bar graph for each set of lengths/diameters. Sketch what you see.

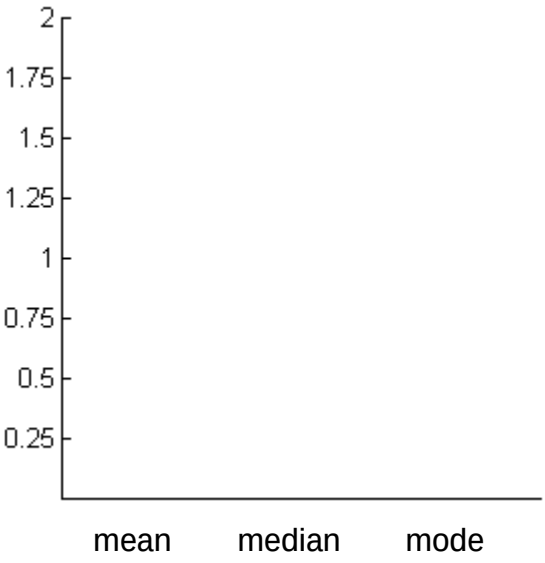
Set A



Set B



Set C



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Clue 1: The Texans had 2 fewer wins in 2004 than losses.
Clue 2: The mean passing yards for the losing data set is less than the mean passing yards for the winning data set.
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Clue 4: The range for the passing yards of the losing games is 258 and of the winning games is in the one hundred range.
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The data sets for 2 students are shown below.

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Losses	Wins
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139	

Sheldon	
Losses	Wins
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313	266
245	233
229	228
215	220
167	201
164	139
157	
114	

Use the clues and a TI-73 calculator to make your own data set. Find the mean, median and mode for each of your data sets. Compare your results to the given student results to decide which student is correct. Justify your reasoning.

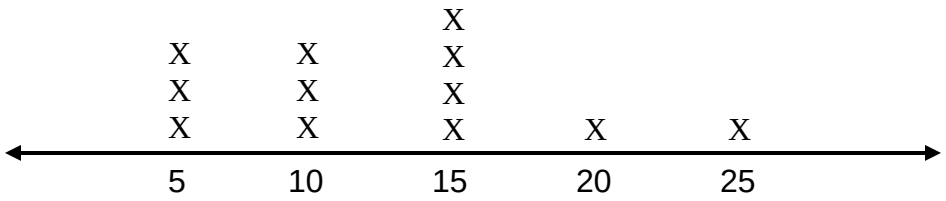
1. The table shows the number of points Menu scored during the first 5 basketball games.

Game	Points Scored
1	15
2	11
3	18
4	12
5	29

If Menu wants to predict how many points he will score during the next game, which measure of the data should he use?

A Mean
B Median
C Mode
D Range

2. Mai charges $5 per hour for babysitting. She decided to chart the amount she earned on different evenings spent babysitting during the past month.



What was the median amount she earned during the month?

A $10
B $12.50
C $14
D $15

3. In his first three hours of waiting tables, Kimiko received the following tip amounts.

$2 $1.50 $2 $3.25 $5 $2.25 $12

If Kimiko wants to ask for a raise by showing his tips are not very good, which measure of central tendency should he show his boss?

A Mean
B Median
C Mode
D Range

4. To participate in an activity at the Fall Festival or purchase food items, tickets must be purchased. Below is a table that describes some booths and food items at the Fall Festival and the number of tickets needed for that booth.

Activity or Food Item	Number of Tickets
Cake Walk	3
Fishing	2
Moon Walk	4
Pony Ride	6
Ring Toss	2
Rock Climbing	7
Chips	3
Drinks	3
Hot Dogs	5
Nachos	5

If the Fall Festival adds a petting zoo to the list above, how many tickets should the petting zoo cost for the mean to stay the same?

A 3
B 3.5
C 4
D 5

The Helper Dilemma

1. Use a coin and a 10-sided number decahedron to simulate the experiment 40 times. Record your results in the frequency table.

Combination	Tally	Frequency
Head, 1		
Head, 2		
Head, 3		
Head, 4		
Head, 5		
Head, 6		
Head, 7		
Head, 8		
Head, 9		
Head, 10		

Combination	Tally	Frequency
Tail, 1		
Tail, 2		
Tail, 3		
Tail, 4		
Tail, 5		
Tail, 6		
Tail, 7		
Tail, 8		
Tail, 9		
Tail, 10		

2. Transfer your information into **The Teacher Helper** document. Follow the instructions in the orange boxes numbered 1-6.

3. Create a graph to represent the Theoretical Probability in Column B.
   - Highlight the Combinations (i.e. Head, 1) in Column A along with the data in the green cells in Column B.
   - Go to Insert Chart.
     - Choose "doughnut" for the chart type on the left-hand side.
     - Click on next twice and type in the title "Theoretical Probability."
     - Click on the tab that reads "Legend." Click in the box next to "Show Legend" so that the check mark disappears.
     - Click on the tab that reads "Data Labels." Click inside the boxes next to "Category Name and Value" so that a check mark appears in both boxes.
     - Click on finish.
     - Click and hold inside the chart. Drag the chart below the first set of data.
     - Enlarge the chart by clicking on a corner and dragging to the desired size.

(continue: The Helper Dilemma)

4. Create a graph to represent the Experimental Probability in Column I (include the Combinations such as Head, 1). Follow the same instructions as #3 except highlight the information in Columns H and I and use the title "Experimental Probability." Drag the chart next to the Theoretical Probability Chart, the first chart.

5. Print the document. Be sure to preview the pages to be printed. You may need to adjust margins so that you only print 1 or 2 pages.

6. How were the experimental and theoretical probabilities the same? Explain.

7. How were the experimental and theoretical probabilities different? Explain.

8. If the fractions were changed to percents, what would you expect the percents to total and why?

9. If Mrs. Alexander has more students enrolled in her class, how can she change or modify her procedure for finding a helper?

Use the following information to answer questions 8-13.

In one particular class, Mrs. Alexander assigned combinations with Heads and a prime number to only boys and combinations with Tails to only girls.

10. What is the sample space for this class?

11. What can you conclude about this particular class? Explain.

(continue: The Helper Dilemma)

12. Which gender is most likely to be the helper? Explain.

13. What is the probability of a girl being the helper? Explain.

14. What is the probability of a boy being the helper? Explain.

15. How could Mrs. Alexander change or modify her procedure for finding a helper in this class to eliminate the extra combinations? Explain.

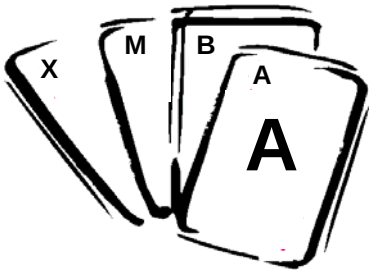
The Choir Helper

The choir teacher, Mr. Roberts, heard Mrs. Alexander in the teacher's lounge describe her method for assigning a helper. He thought the idea would be a big help in his classes. Since his choir classes sometimes have between 45 and 50 students and no students can be assigned the same "code," Mr. Roberts cannot use the coin and 10-sided number decahedron. Mrs. Alexander gave Mr. Roberts 8 different items that he could use to assign helpers in his class.

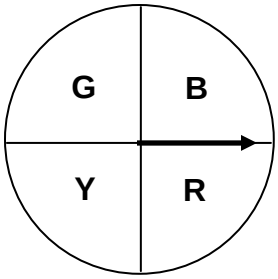
A Coin

A Six-Sided Number Cube

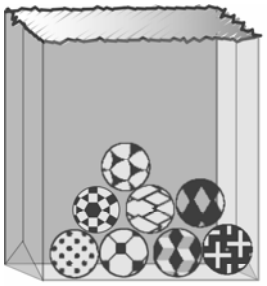
A 10-sided Number Decahedron with the numbers 1-10



A Set of Alphabet Cards A-Z

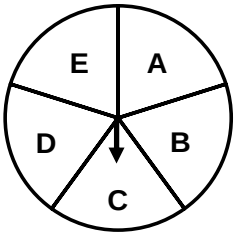


A Spinner



A Bag of 8 Different Marbles

A 12-sided Number Dodecahedron with the numbers 1-12



A Spinner

(continue: The Choir Helper)

1. Help Mr. Roberts pair the items together that he can use to assign helpers. There will be 4 pairs. Justify your reasoning for each pair made and tell how many assignments for helpers could be made from each pair.

2. Choose one of the pairs of items above and simulate the event for 50 trials. Create a frequency table to record your results.

3. Create a table in **The Teacher Helper** document under the tab titled **The Choir Helper** to organize the results.

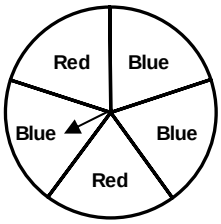
4. Use the spreadsheet to predict the results if the event had been simulated for 100 trials? 250 trials? Make a separate column for each and use formulas to make predictions.

5. Print the document.

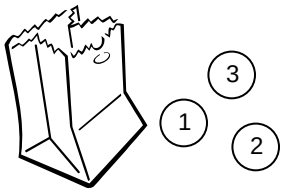
Simulation

Use the following items to simulate an experiment.

A Coin



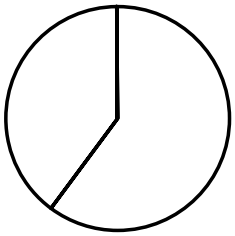
A Spinner



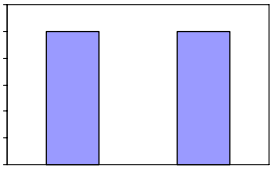
A Bag of 3 Marbles
Numbered 1-3

Which of the following graphs best represents the results of the experiment? Justify your reasoning.

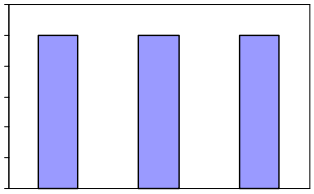
A.



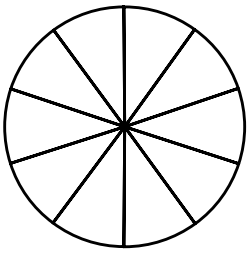
C.



B.



D.



1. Corbyn has a standard code of dress at his school. He can wear a white or green shirt with navy or khaki pants. He had 3 white shirts and 2 green shirts in his shirt drawer and 1 pair of navy pants and 3 pairs khaki pants in his pants drawer. What is the probability that Corbyn will reach in both drawers, without looking, and get a white shirt and navy pants?

   A $\frac{17}{20}$

   B $\frac{4}{9}$

   C $\frac{3}{25}$

   D $\frac{3}{20}$

2. A 6-sided number cube, a spinner divided into 3 equal parts labeled A, A, B, and a coin are being used for an experiment. Ozzie calculated the theoretical probability of an event where the number cube was rolled, coin tossed, and spinner spun. His calculation was $\frac{1}{3} \cdot \frac{1}{2} \cdot \frac{2}{3} = \frac{2}{18} = \frac{1}{9}$. For which of the following events did Ozzie calculate the probability?

   A P(even number, head, B)

   B P(1 or 2, head, A)

   C P(prime number, tail, A)

   D P(odd number, tail, A)

3. The letters of the word WINNER are cut apart and placed in a bag. A letter was drawn from the bag and a coin tossed at the same time. Results were recorded and the letter was placed back into the bag. Which of the following could NOT be used to represent the experimental data?

   A Venn diagram

   B Bar graph

   C Circle graph

   D Line Plot

4. A container of markers containing 3 red, 1 yellow, 2 green and 4 blue are placed at the map center in social studies. The rule is you can only use one marker at a time so that everyone will have a marker to use. What is the probability of reaching into the container without looking for each use and getting a red marker, a blue marker and then a yellow marker?

   A $\frac{3}{250}$

   B $\frac{12}{30}$

   C $\frac{12}{100}$

   D $\frac{8}{10}$

The Helper Dilemma

1. Use two TI-73 calculators to simulate the probability. Each student should hold a calculator. One calculator should be used to simulate the coin toss and the other used to simulate rolling a 10-sided number decahedron. Follow the instructions below to simulate the events with the calculators. Combine the results and place a tally mark in the frequency table below. Perform the experiment 40 times.

Coin Toss
APPS 7: Prob Sim Press any key 2. Toss Coin Toss (Window)

Roll Dice
APPS 7: Prob Sim Press any key 1. Roll Dice Set (Zoom) Sides: 10 OK (Graph) Roll (Window)

Combination	Tally	Frequency
Head, 1		
Head, 2		
Head, 3		
Head, 4		
Head, 5		
Head, 6		
Head, 7		
Head, 8		
Head, 9		
Head, 10		

Combination	Tally	Frequency
Tail, 1		
Tail, 2		
Tail, 3		
Tail, 4		
Tail, 5		
Tail, 6		
Tail, 7		
Tail, 8		
Tail, 9		
Tail, 10		

2. Graph the data using the instructions below. Sketch the resulting graph.

Graph Data

Enter the frequency data in L2 of the LIST feature.

2nd
Plot (Y=)
1: Plot 1
On
Type: Pie Chart
Graph

Sketch graph here.

3. Find the experimental probability for each.

Combination	Experimental Probability
Head, 1	
Head, 2	
Head, 3	
Head, 4	
Head, 5	
Head, 6	
Head, 7	
Head, 8	
Head, 9	
Head, 10	

Combination	Experimental Probability
Tail, 1	
Tail, 2	
Tail, 3	
Tail, 4	
Tail, 5	
Tail, 6	
Tail, 7	
Tail, 8	
Tail, 9	
Tail, 10	

(continue: The Helper Dilemma)

4. How were the experimental and theoretical probabilities the same? Explain.

5. How were the experimental and theoretical probabilities different? Explain.

6. If the fractions were changed to percents, what would you expect the percents to total and why?

7. If Mrs. Alexander has more students enrolled in her class, how can she change or modify her procedure for finding a helper?

Use the following information to answer questions 8-13.

In one particular class, Mrs. Alexander assigned combinations with Heads and a prime number to only boys and combinations with Tails to only girls.

8. What is the sample space for this class?

9. What can you conclude about this particular class? Explain.

10. Which gender is most likely to be the helper? Explain.

11. What is the probability of a girl being the helper? Explain.

(continue: The Helper Dilemma)

12. What is the probability of a boy being the helper? Explain.

13. How could Mrs. Alexander change or modify her procedure for finding a helper in this class to eliminate the extra combinations? Explain.

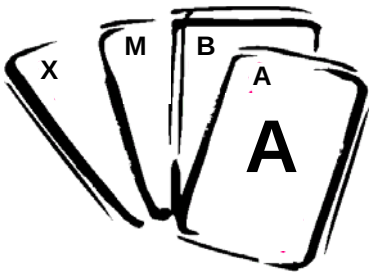
The Choir Helper

The choir teacher, Mr. Roberts, heard Mrs. Alexander in the teacher's lounge describe her method for assigning a helper. He thought the idea would be a big help in his classes. Since his choir classes sometimes have between 45 and 50 students and no students can be assigned the same "code," Mr. Roberts cannot use the coin and 10-sided number decahedron. Mrs. Alexander gave Mr. Roberts 8 different items that he could use to assign helpers in his class.

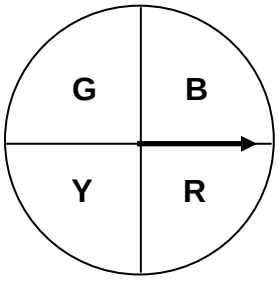
A Coin

A Six-Sided Number Cube

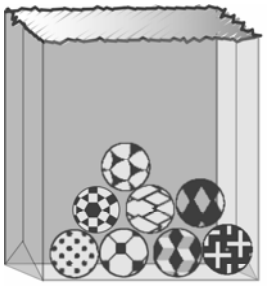
A 10-sided Number Decahedron with the numbers 1-10



A Set of Alphabet Cards A-Z

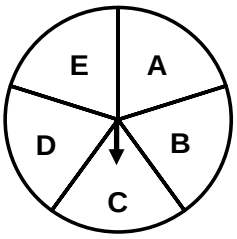


A Spinner



A Bag of 8 Different Marbles

A 12-sided Number Dodecahedron with the numbers 1-12



A Spinner

(continue: The Choir Helper)

1. Help Mr. Roberts pair the items together that he can use to assign helpers. There will be 4 pairs. Justify your reasoning for each pair made and tell how many assignments for helpers could be made from each pair.

2. Choose one of the pairs of items above and describe how to simulate the event using the calculator.

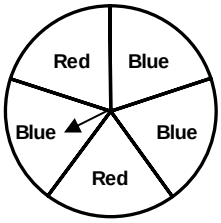
3. Use the plan outlined in #2 to simulate the event for 50 trials. Create a table to record the results.

4. From the above results, predict the results if the event had been simulated for 100 trials.

Simulation

The following items are being used to simulate an experiment.

A Coin



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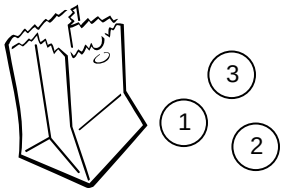

A Bag of 3 Marbles
Numbered 1-3

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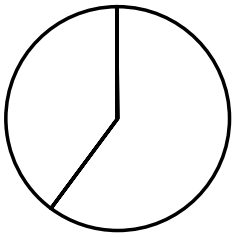

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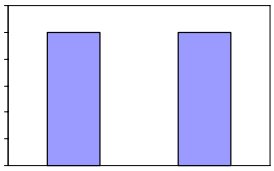

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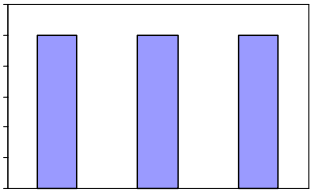

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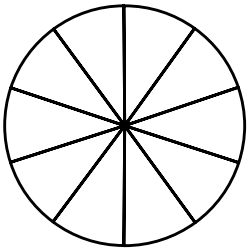

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