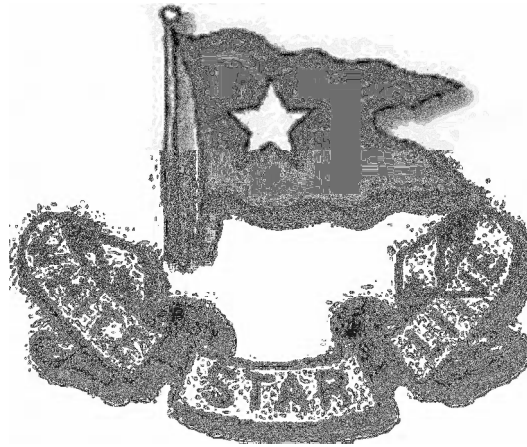


MEASUREMENT & STATISTICS

RMS TITANIC



ROYAL MAIL STEAMER TITANIC

SIXTH GRADE MATHEMATICS

CHAPTER 7

TOPICS COVERED:

- ❖ Mean, Median, Mode, and Range
- ❖ Frequency Tables and Line Plots
- ❖ Bar Graphs
- ❖ Coordinate Graphing
- ❖ Line Graphs
- ❖ Stem-and-Leaf Plots
- ❖ Misleading Statistics
- ❖ Choosing an Appropriate Display
- ❖ Titanic Travel Brochure

7 7 17 17 25

Mean – The mean of a set of numbers is the same as the average. To determine the mean, add up all of the numbers and divide by the quantity of numbers.

$$\text{MEAN} = \frac{7+7+17+17+25}{5} = 14.6$$

The mean is **14.6**.

Median – The median of a set of numbers is the middle number when the numbers are lined up from greatest to least. In other words, half of the numbers are more than the median and half of the numbers are less than the median.

7 7 (17) 17 25

17 is the median of this set of numbers.

If two numbers are in the middle, the median is determined by averaging those two numbers.

Mode – The mode of a set of numbers is the most common number in a set. If two or more numbers are the most common, all of those numbers are the modes. **If all numbers in a set are in equal amounts, then there is “no mode”.**

The mode of the set of numbers above is **7 and 17**.

Range – The range of a set of numbers is the difference between the smallest and largest numbers.

The range for the set of numbers above is **18** ($25 - 7$).

Bar Graph

- A display in which numbers are represented by bars whose heights or lengths correspond to the magnitude of the numbers being represented.
- Compares data from several situations.

Line Graph

- A line drawn through pairs of associated numbers on a coordinate grid.
- Time is graphed on the horizontal axis.
- Used to show changes over time.

Circle Graph

- A display in which parts of a whole are represented by sectors that show the fraction of the whole taken up by each part.
- Often called a pie chart.
- Allows you to visually compare a part of the data to the whole set of data.

Line Plot

- A display of data that uses stacked Xs to show how many times each data value occurs.
- The values are listed on a horizontal number line.

Stem-and-Leaf Plot

- Displays a collection of numbers in which the digits in certain place values are designated as the stems and the digits in lower place values are designated as the leaves.
- Leaves are placed side-by-side next to the stems.

Venn Diagram

- A visual aid that uses circles to represent sets and the relationships between them.

“How could we have saved more people aboard the *Titanic*?”

Create an exciting, entertaining, and informative *Titanic* Survival brochure

Choose one of the following options:

- How could we have saved an additional 300 people?
- How could we have saved an additional 800 people?
- How could we have saved an additional 1250 people?

Brochure Requirements

- Use the mean, median, mode, and range of at least one set of data (at least 8 numbers) to make a conclusion
- Create at least two different graphs to display important data to your reader
- Create a table of the data used in your graphs
- As part of your description on how to save more people show at least 6 unit conversions.
 - Three within customary units
 - Three within metric units
- Demonstrate your knowledge of rates, unit rates, and ratios in some fashion to help the reader understand a topic.
- Demonstrate your knowledge of fractions, decimals, and percentages (including conversions) in some fashion to help the reader understand a topic.

Hints of advice for getting a maximum grade:

- ❖ Creative approaches to solving the problem are welcome. Make sure to use real data about the *Titanic* to support your approach.
- ❖ The more you demonstrate your math knowledge, the better.
- ❖ The final brochure should have a common “look/theme”. Neatness matters.
- ❖ Your grade is not based on the most colorful. It is mostly based on the math.
- ❖ You are responsible for completing all the math, not a computer or calculator.
- ❖ Feel free to add any “extras” to make your brochure more appealing. Cite any sources you use.

For this section use the numbers listed in “Loading the Titanic” section.

Find the mean, median, mode, and range using the data above (nearest whole number).

		Mean	Median	Mode	Range
1.	Cutlery – Left column				
2.	Cutlery – Right column				
3.	Cutlery – Both columns				
4.	Linens – Left column				
5.	Linens – Right column				

Votes for your favorite year – 144 people surveyed

1912	1913	1914	1915	1916	1917	1918	1919
12	15	17	18	20	32	18	12

Find the mean, median, mode, and range using the data above (nearest hundredth).

		Mean	Median	Mode	Range
6.	First 4 years				
7.	First 5 years				
8.	First 6 years				
9.	First 7 years				
10.	All 8 years				

11.	{12, 8, 6, 14, 18, 8, 300} Why is the mean of the set above not a good representation of the set of numbers?	
12.	{2, 4, 4, 6, 84, 88, 92, 98} Why is the median of the set above not a good representation of the set of numbers?	
13.	{1, 1, 4, 5, 6, 7, 8, 9, 10, 90, 90} Why is the mode of the set above not a good representation of the set of numbers?	
14.	{3, 3, 6, 6, 9, 9} What is the mode of this set of numbers?	
15.	A set of 5 different positive integers has a mean of 33 and a median of 40. How large can the greatest number be?	
16.	Research the winning and losing scores of the last 11 Super Bowls. What is the median winning score and the median losing score?	

CIRCLE GRAPHS – Titanic Passengers & Titanic Survivors

1.	Which two categories of passengers made up about three-fourths of the people sailing on the Titanic?	
2.	What is the sum of the percentages on any circle graph?	
3.	Were there more third class passengers or more “higher class” passengers?	
4.	Did more crew survive of first class passengers survive?	
5.	Which categories of survivors add up to nine-twentieths?	
6.	Just looking at the survivor circle graph, it appears that the crew and third class did well with 55% of the survivors coming from these two categories. Why is this misleading?	

BAR GRAPH – Titanic Adult Passengers & Survivors

7.	Which class had the most female passengers?	
8.	About what fraction of the male crew survived?	
9.	Did more male adults or female adults survive?	
10.	About what percent of first class male passengers survived?	
11.	Did more third class males or first class males survive?	
12.	Was the number of surviving males more or less than 400?	

BAR GRAPH – Titanic Children Passengers & Survivors

13.	Which class of children had the most survivors?	
14.	Which class of children had the smallest percentage of survivors?	
15.	Were there more male or female children aboard the Titanic?	
16.	About what percent of third class male children survived?	
17.	Were the more second class female or male children aboard the Titanic?	
18.	Third class male children made up about what percent of all the male children aboard the Titanic?	

LINE GRAPH – Titanic Lifeboats % Occupied

19.	Which lifeboat(s) were the least percent occupied?	
20.	Why do you think earlier lifeboats were generally not as occupied as later lifeboats?	
21.	What was the median percentage occupied of the first five lifeboats?	
22.	What was the first lifeboat that was more than three-fourths full?	
23.	What was the approximate mean percentage occupied of the first 10 lifeboats?	
24.	Based on the trend, make a prediction for the percent occupied of 11 th lifeboat launched. 12 th lifeboat? 13 th lifeboat?	

SCATTER PLOT – Yearly North Atlantic Iceberg Total

1.	Which year(s) had the highest total number of icebergs?	
2.	Which year had about twice as many icebergs as 1906?	
3.	Just looking at the graph, what would be a good estimate of the mean number of icebergs per year?	
4.	What is the median number of icebergs per year?	
5.	Which two years combine for 1000 icebergs?	
6.	Does the scatter plot show a positive, negative, or no relationship?	

HISTOGRAM – April North Atlantic Iceberg Total

7.	What would be a good estimate of the median number of icebergs each April?		
8.	Why would the mean not be a good representation of the entire set of data?		
9.	How many years were there 50 or less April icebergs?		
10.	Is there a better chance of having 75 icebergs or 375 icebergs?		
11.	Create the frequency table for the histogram.	1-50	6

LINE PLOT – Titanic Lifeboat Capacities

12.	What is the mode of the lifeboat capacities?	
13.	How many lifeboats had a capacity of 47?	
14.	Approximate the mean of the lifeboat capacities.	
15.	What is the total capacity of all lifeboats which can hold less than 50 passengers?	
16.	What is the median of the lifeboat capacities?	

VENN DIAGRAM – Titanic Passengers

17.	How many men passengers were aboard the Titanic?	
18.	How many first class passengers were aboard the Titanic?	
19.	How many passengers were men traveling first class?	

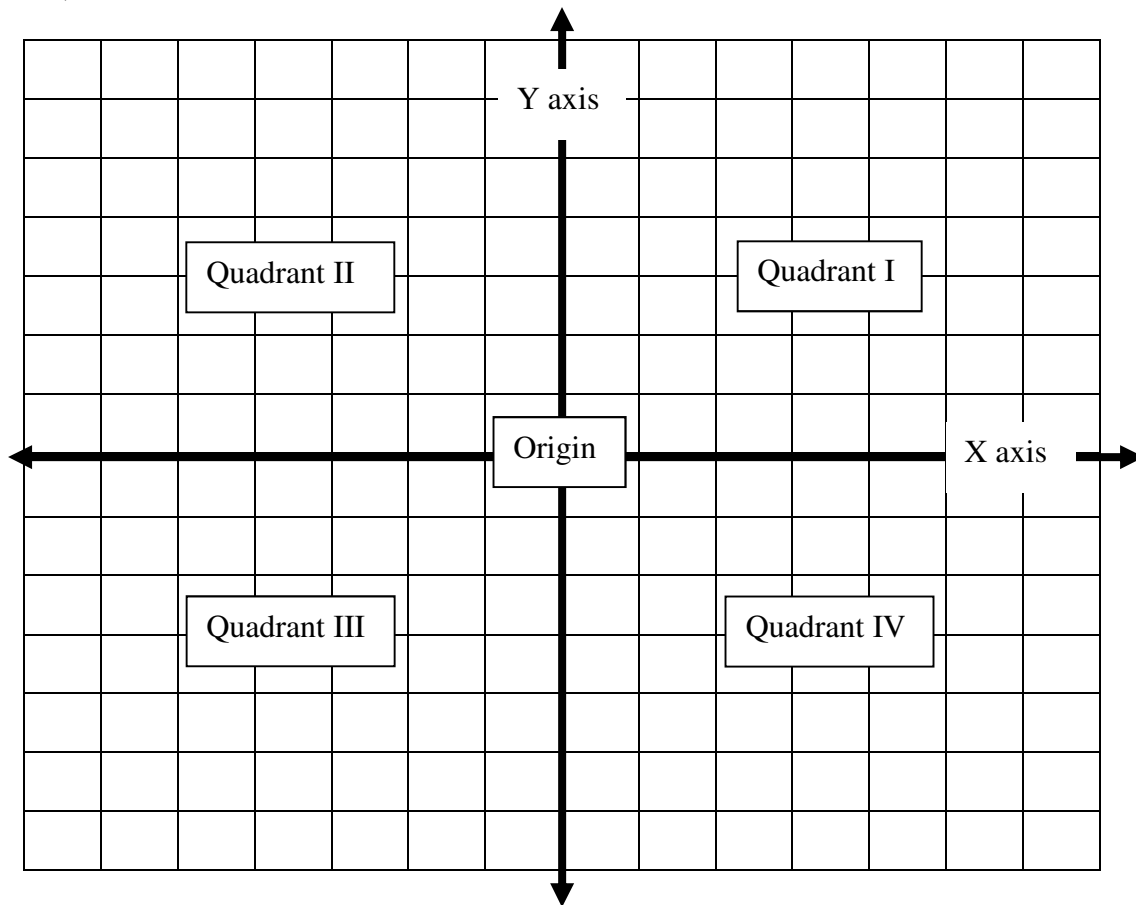
Determine which kind of graph (line, bar, circle) is the most appropriate.

1.	Show the number of students enrolled in each grade at a particular high school.	
2.	Compare the cost of a telephone call with the length of the call.	
3.	Show the number of winning games for different soccer teams during a season.	
4.	Show your height between ages 6 and 13.	
5.	Show the monthly sales of all the departments in a store.	
6.	Compare the increase in typing speed with the number of hours of practice.	
7.	Show the amount of federally owned land in each state in the south.	

Stem-and-Leaf Plot

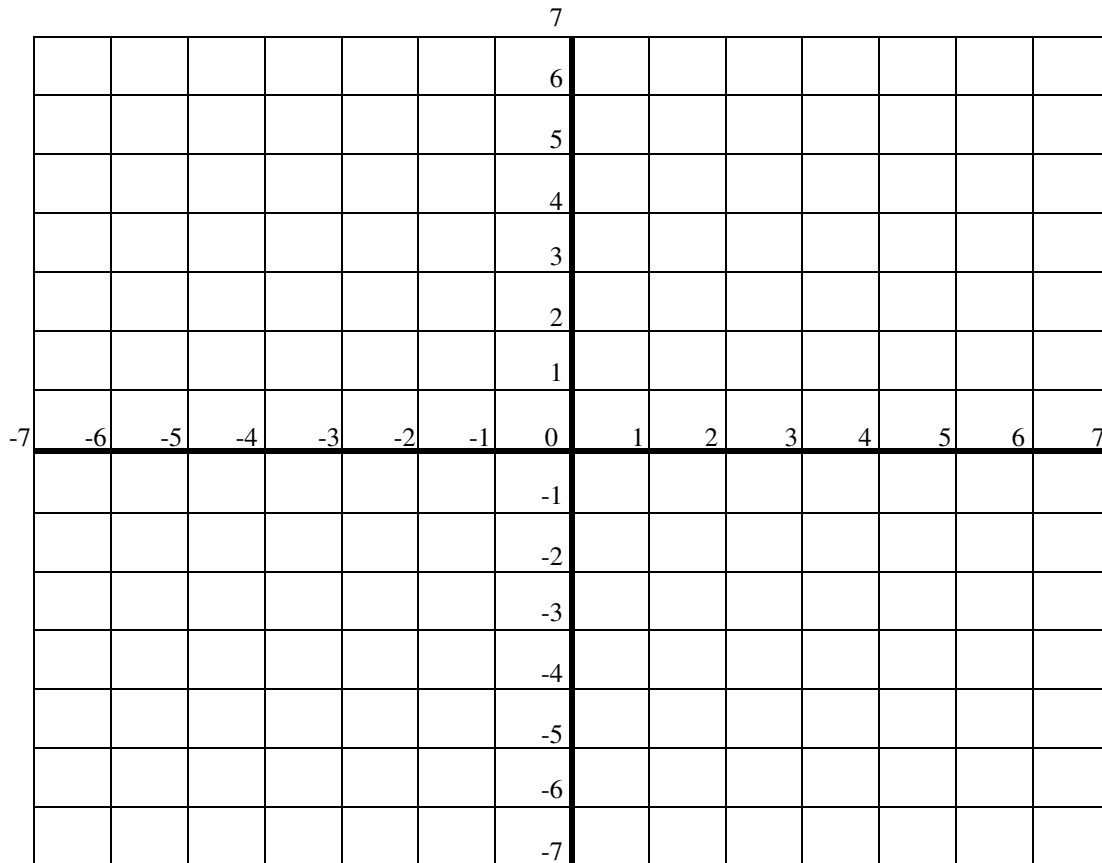
8.	Create a stem-and-leaf plot for the occupants of the 20 lifeboats. Let the stem represent the tens place and the leaves the ones place. Make sure to include a key.
9.	Create a stem-and-leaf plot for the percentage of Titanic survivors by nationality (just the 6 nations listed). Make sure to include a key.

The Cartesian coordinate system is named after the French mathematician, Rene Descartes (1596-1650).



Write your answer in Roman numerals, where possible.

1.	In which quadrant would you find $(-3,2)$?	
2.	In which quadrant would you find $(-5,-8)$?	
3.	In which quadrant would you find $(4,7)$?	
4.	In which quadrant would you find $(8,-10)$?	
5.	In which quadrant would you find $(-13,6)$?	
6.	In which quadrant would you find $(7,-12)$?	
7.	In which quadrant would you find $(-5,-5)$?	
8.	In which quadrant would you find $(13,11)$?	
9.	On which axis would you find $(6,0)$?	
10.	On which axis would you find $(0,8)$?	
11.	On which axis would you find $(0,-13)$?	
12.	Where would you find $(0,0)$?	



1.	First, plot two vertices of a right triangle on the coordinate plane above. Place dot A at $(-2,-5)$ and dot B at $(-4,3)$.	
2.	Name the two points that could represent the third vertex of the right triangle.	
3.	Which quadrant is dot A in?	
4.	Reflect dot B across the x-axis. What are the coordinates of the new point B?	
5.	Reflect dot A across the y-axis. What are the coordinates of the new point A?	
6.	Place dot D at $(7,4)$. If dot is translated to the left 5 places and down 9 places where is the new dot D?	
7.	Draw one of the two possible triangles that you could have created in question #2.	
8.	If all three vertices of this triangle are translated up 2 and 5 to the right, what are the coordinates of the three new vertices?	

For this activity you need a piece of graph paper. Turn your graph paper portrait style. Draw an x-axis slightly above the midpoint and a y-axis directly down the middle.

Graph each of the points below. Connect the points in order as you graph them.

(-3,1)
(-1,4)
(0,5)
(5,7)
(8,8)
(7,7)
(2,0)
(1,0)
(4,-2)
(6,-6)
(8,-12)
(4,-7)
(2,-7)
(0,-10)
(1,-6)
(0,-3)
(-1,-4)
(-4,-4)
(-5,-3)
(-5,-4)
(-2,-9)
(-8,-4)

(-9,-3)
(-9,-2)
(-7,0)
(-6,1)
(-6,2)
(-8,4)
(-8,7)
(-3,12)
(-3,6)
(-1,4)
STOP
(5,7)
(8,9)
(8,8)
STOP
(-6,1)
(-5,1)
STOP
(-7,0)
(-8,1)
STOP
(8,-2)

(8,-1)
(11,1)
(11,0)
(12,0)
(9,-2)
(8,-2)
(-8,-12)*
(-7,-10)
(-6,-12)
(-8,-12)
STOP
(-2,-14)
(-2,-21)
(-3,-21)
(-3,-18)
(-5,-18)
(-5,-21)
(-6,-21)
(-6,-14)
(-5,-14)
(-5,-17)
(-3,-17)

(-3,-14)
(-2,-14)
STOP
(2,-14)
(2,-21)
(6,-21)
(6,-17)
(4,-17)
(4,-18)
(5,-18)
(5,-20)
(3,-20)
(3,-15)
(6,-15)
(6,-14)
(2,-14)
STOP

* This is a long line. This line should go behind the acute angle at about (-2,-9).

Creating the circle around the outside:

Place dots at (11,0), (0,-11), (-11,0), (0,11). Connect these dots with a curve to create an inside circle (it will go behind the main drawing).

Then place dots at (12,0), (0,-12), (-12,0), (0,12). Connect these dots with a curve to create an outside circle (it will also go behind the main drawing).

Shade or color in the entire circle and then the rest of the drawing.