STEM ONLY | AP Statistics Summer Assignment Guidelines
STEM Mathematics Department
Kimberly Salma, Supervisor
Summer Packet Grading

- On the first day of school, the teacher will check for completion/effort of the packet.
- This will be weighted at 50%.
- Teacher will then review the packet with the students.
- Upon completion of the review, the students will be given an assessment based on the summer packet.
- The assessment will be weighted at 50%.
- The two weighted scores combined will count as one project grade.
- Therefore, the grade for the summer packet will be placed under the "project" category.

----------DIRECTIONS----------

A. In the 1-2 weeks before the start of school, watch the following EdPuzzle videos and complete the corresponding guided notes in this PDF. It is recommended to print the notes but if you cannot, they can be completed in kami.

1. The Language of Variation video on EdPuzzle
    - Guided Notes on pages 2-5 of this PDF
2. Representing Categorical Data with Tables & Graphs video on EdPuzzle
    - Guided Notes on pages 6-12
3. Representing Quantitative Variables with Graphs video on EdPuzzle
    - Focus on creating a histogram by hand. I will teach you how to create one on the TI-84 in class as the teacher in the video uses a different calculator model.
    - Guided Notes on pages 13-19

B. Skills you can expect on this first assessment include:

1. Identifying individuals and variables
2. Creating data displays for categorical variables
3. Creating a data displays for quantitative variables
4. Vocabulary

The Language of Variation: Variables

Lesson 2

Learning Objective:

- Identify variables in a set of data. **Skill 2.A** **VAR-1.B**
- Classify types of variables. **Skill 2.A** **VAR-1.C**
- Identify the individuals in a set of data.

Vocabulary

Statistics:

Descriptive Statistics:

Inferential Statistics:

Individuals:

Categorical Variables (Qualitative Variables):

Quantitative Variables:

Discrete Variable:

Variables

Continuous Variable:

Distributions:

Example 1: Your principal gives your class an assignment to collect data from the student body. The data you will collect are ages, gender, grade level, GPA, number of siblings, and the name of the students' guidance counselors.

(a) Who are the individuals in the data provided?

(b) What are the variables?

(c) Identify the variables as categorical or quantitative. Identify the quantitative variables as discrete or continuous.

Categorical	Quantitative	
	Discrete	Continuous

Variables

When it comes to quantitative data it should make sense to calculate the _____ of the variable.
Not all numerical data is quantitative.

Example 2: What are some examples of numerical data where it does NOT make sense to find the mean (average) of the variable?

Practice Problems

Directions: Use the data we collected on our class to answer questions 1-3.

1. Who or what are the individuals our data describes?

2. What variables were recorded on our individuals?

3. Identify each variable as categorical or quantitative. Define the quantitative variables as discrete or continuous. Explain your choice for each variable.

4. A survey was conducted among 2000 US adults. 71% of men and 58% of women responded that they had a yearly physical with the doctor this past year.

(a) Identify the descriptive aspect of this survey.

(b) What inference could be drawn from this survey?

Representing Categorical Variables with Tables and Graphs

Lesson 3 and 4

Learning Objective:

- Represent categorical data with relative frequency and frequency tables. **UNC-1.A** **Skill 2.B**
- Describe categorical data from tables. **UNC-1.B.** **Skill 2.A**
- Represent categorical data graphically. **UNC-1.C.** **Skill 2.B**
- Describe categorical data from graphs. **UNC-1.D.** **Skill 2.A**
- Compare sets of categorical data. **UNC-1.E.** **Skill 2.D**
- Identify deceptive graphs

Essential Knowledge

- Frequency table gives the number of cases that fall into each category. **UNC-1.A.1**
- Relative frequency table gives the proportion of cases falling into each category. **UNC1.A.1**
- Percentages, relative frequency, and rates all provide the same information as proportions. **UNC-1.B.1**
- Counts and relative frequencies of categorical data reveal information that can be used to justify claims about the data in context. **UNC-1.B.2**
- Bar charts (bar graphs) are used to display frequencies or relative frequencies for categorical data **UNC-1.C.1**
- The height or length of each bar graph corresponds to either the number or proportion of observations falling within each category **UNC-1.C.2**
- There are many ways to represent frequencies or relative frequencies for categorical data **UNC-1.C.3**
- Graphical representations of a categorical variable reveal information that can be used to justify claims about the data in context
- Frequency tables, bar graphs, or other representation can be used to compare two or more data sets in terms of the same categorical variable

Vocabulary

Pie Chart:

Bar Graph:

Frequency:

Relative Frequency:

Tables for Categorical Data

One-Way Table:

Steps to Create a Frequency Table

1.

2.

3.

Example 1: Create a frequency distribution of the hair color distribution for your class.

Steps to Create a Relative Frequency Table

1.

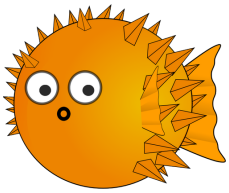
2.

3.

4.

Tables and Graphs for Categorical Data

Example 2: Create a relative frequency table of the hair color distribution for your class.



Describe what you see in the two tables.

Steps to Create Pie Charts

1.

2.

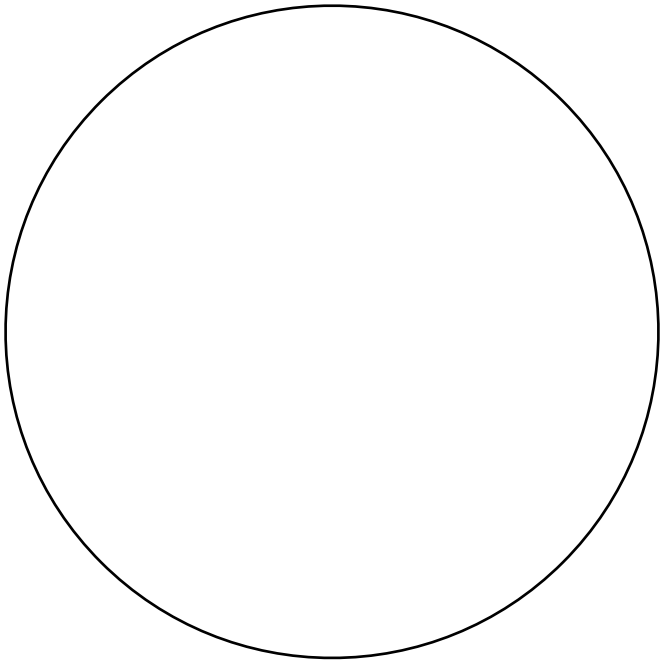
3.

4.

5.

Tables and Graphs for Categorical Data

Example 3: Create a pie chart displaying the types of pets students have for your class.



Steps to Create a Bar Graph

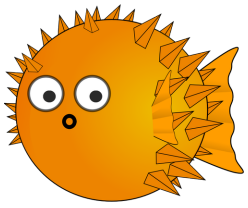
1.

2.

3.

Tables and Graphs for Categorical Data

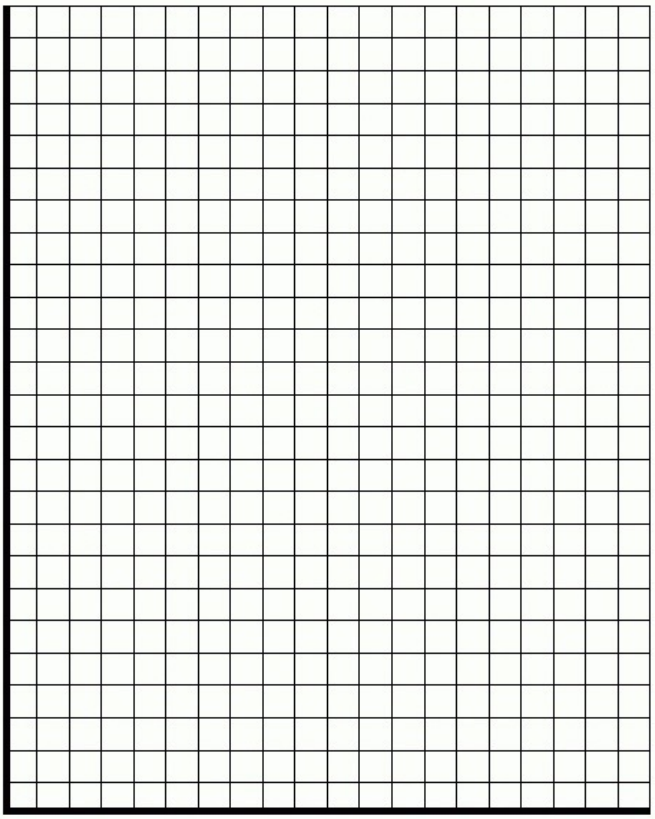
Example 4: Create a frequency bar graph and a relative frequency bar graph offer the distribution of pet types for students in your class.

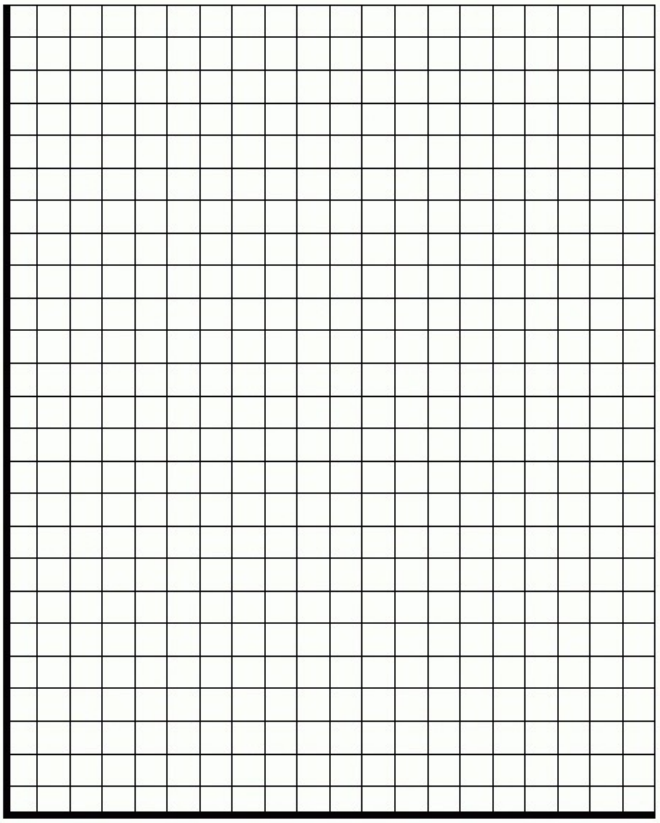


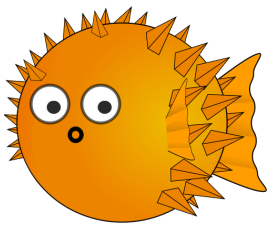
Describe what you see in the bar graphs.

Comparing Sets of Categorical Data

Example 5: Create bar graphs for the distribution of male and female hair color distribution for your class.





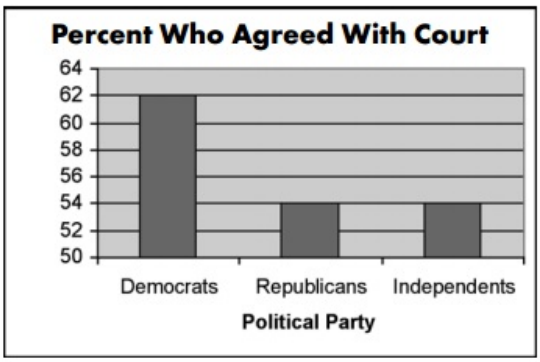


Describe what you see by comparing the distributions

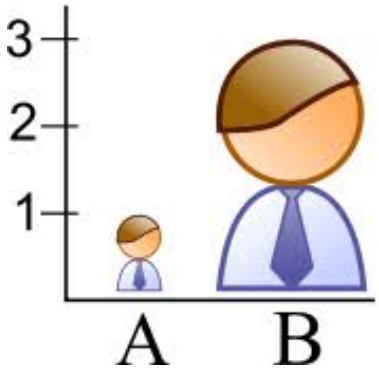
Deceptive Graphs

Graphs are often used to mislead or deceive people. Analyze the following graphs and identify the characteristics that could be misleading.

1.



2.



3.

Representing Quantitative Variables with Graphs

Lesson 5

Learning Objectives

- Represent quantitative data graphically **UNC-1.H.** **Skill 2.B**

Essential Knowledge

- In a histogram, the height of each bar shows the number or proportion of observations that fall within the interval between two values of a continuous variable **UNC-1.G.1**
- In a stem and leaf plot, each data value is split into a "stem" (the first digit or digits) and a "leaf" (the last digit). **UNC-1.G.2**
- A dot plot represents each observation by a dot, with the position on the horizontal axis corresponding to the data value of that observation. **UNC-1.G.3**
- A cumulative graph represents the number or proportion of a data set less than or equal to that number. **UNC-1.G.4**
- There are many different ways to graphically display quantitative data. **UNC-1.G.5**

Dot Plots

Dot plots are the easiest way to graphically display quantitative data.

There are two steps to create a dot plot.

1.

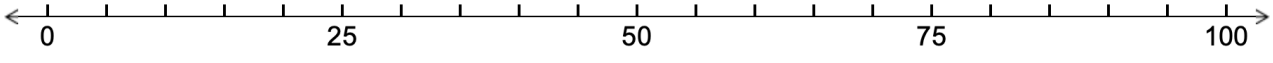
2.

Example 1: We will use the test scores below to create a dot plot.

Test Scores:

0 20 25 25 30 30 35 35 40 45 45 45 45 50 50 55 55 55 60 70 70 70 70 75 75 80

85 90 100



Histograms

Histograms are great for displaying **large** data sets. One **drawback** is we can't see individual data values in a histogram.

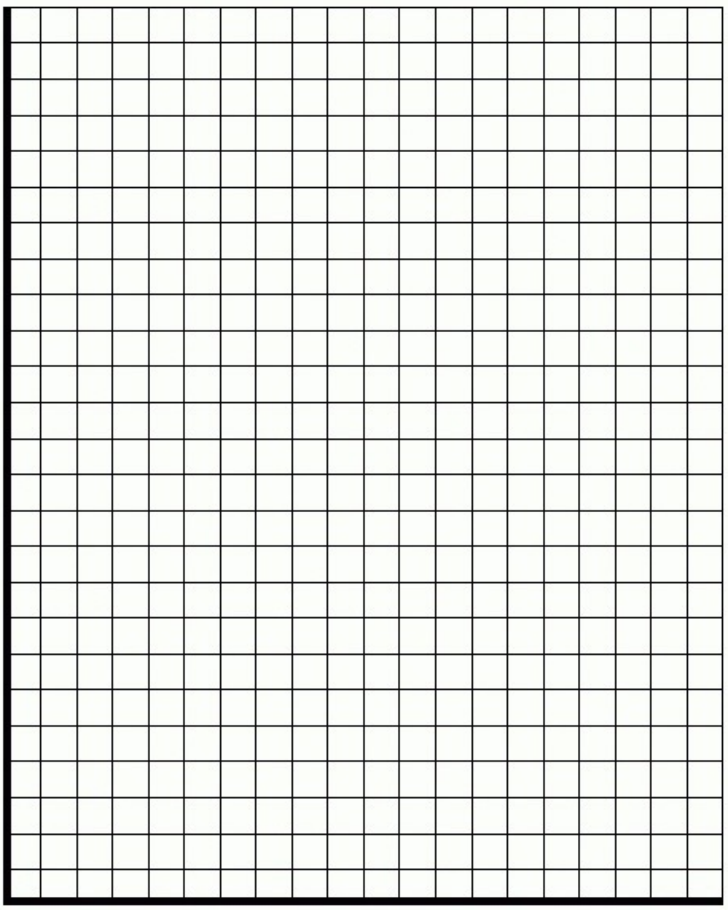
There are 9 steps to create a histogram by hand.

	In words	**In math**
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Steps to create histograms with your calculator. I will show you how to do this on a TI-84 in class. The teacher in the video uses a different model.

Histograms

Example 2: Create a relative frequency histogram with 6 bins for the test score data from example 1.



Stem Plots

Stem plots are used to display **small** sets of data. They give us a quick picture of the shape of the distribution. A **minimum of 5 stems** is recommenced. ALWAYS remember to **make a key.**

There are 5 steps to create a stem plot.

1.

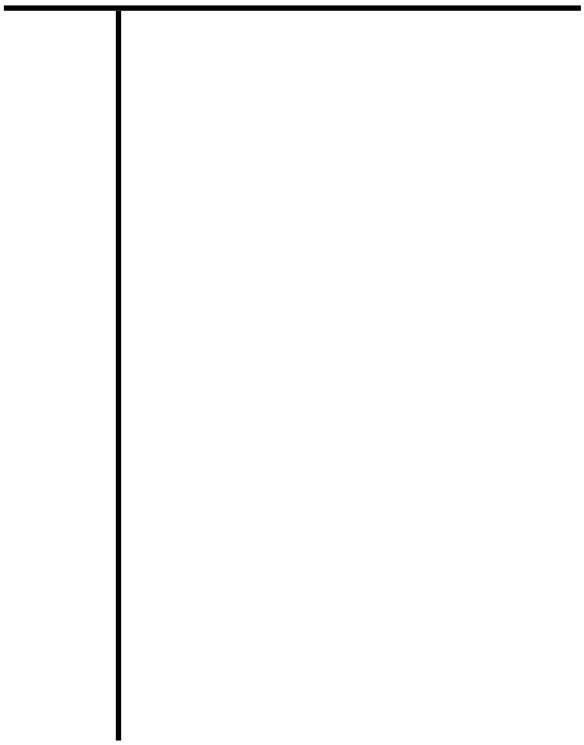
2.

3.

4.

5.

Example 3: Create a stem plot of test scores from example 1.



Stem Plots

When there are only a few stems or the data is very compact, splitting the stems is recommended.

There are two steps to create a split stem plot.

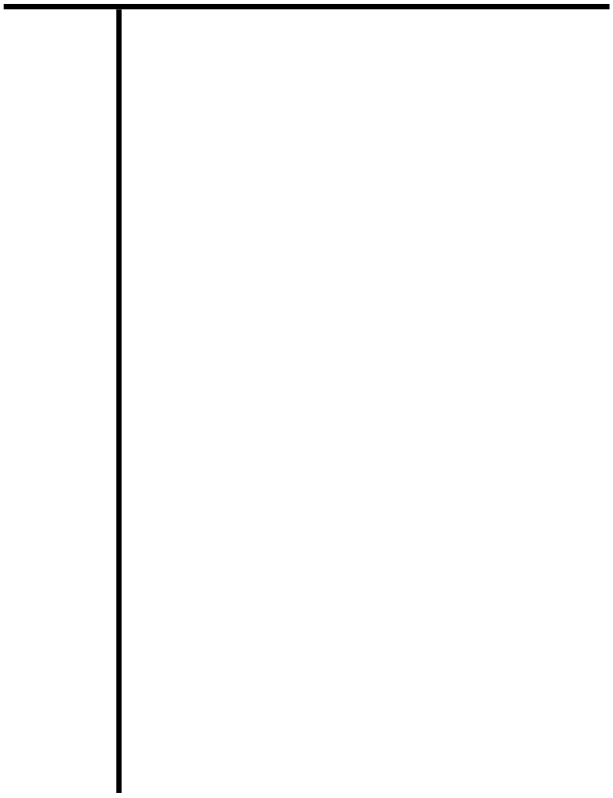
1.

2.

Example 4: Here is a stem plot of test scores. Create a split stem plot of these scores.

3	4
4	3 4 7 7
5	2 2 4 4 7 7 8
6	0 2 2 3 4 4 4 4 7 9 9
7	2 3 3 4 5 5 6 6 6 6 7 7 8 8
8	0 1 1 4 6 7 7 7 9
9	1 2 2 4 5 8

Key
4| 3 = Test score of 43



Stem Plots

Later in this unit we will compare distributions of univariate data. A back-to-back stem plot is useful to compare two sets of data.

There are two steps to create a back-to-back stem plot to compare two distributions.

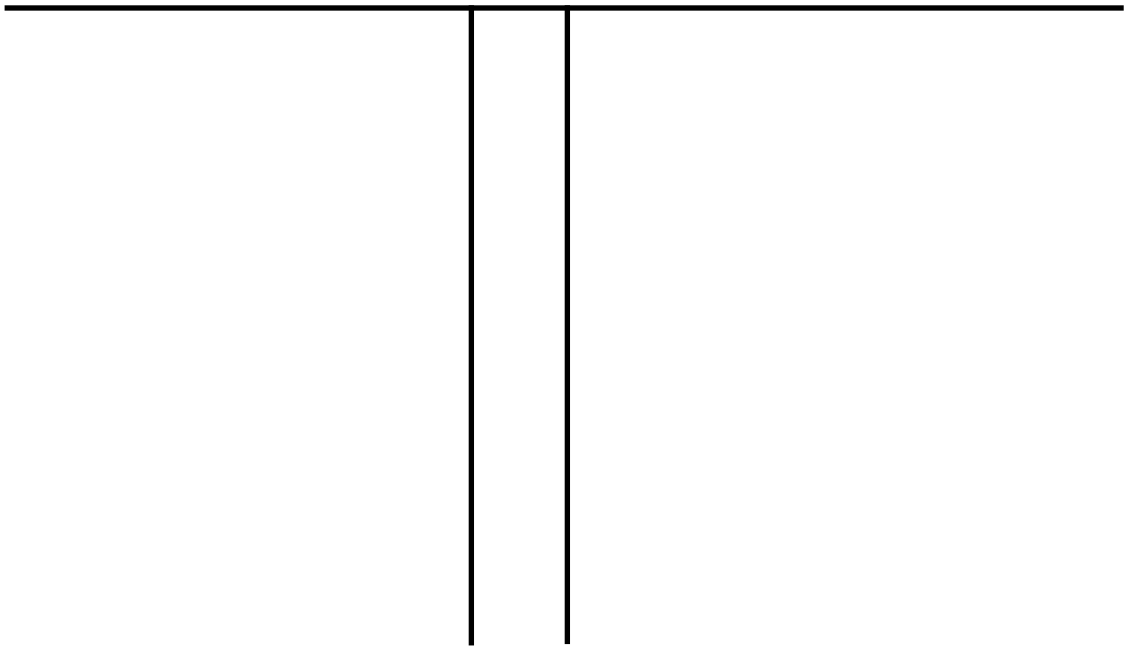
1.

2.

Example 5: Create a back-to-back stem plot to compare the two sets of test scores.

Test Scores for group 1:
30 35 35 43 43 48 48 50 53 53 55 55 55 60 60 63 63 63 65 68 68 68 70 75 78
85 88 88 90 93 95 95

Test Scores for group 2:
35 43 45 48 48 50 53 53 53 55 58 58 60 63 63 68 70 75 75 83 98 100 100 108



Cumulative Relative Frequency Graphs

This graph displays the cumulative frequency or cumulative relative frequency of each class(bin) at its upper class boundary. The upper boundaries are marked on the horizontal axis and the cumulative frequencies (or relative cumulative frequencies) are marked on the vertical axis.

There are 5 steps to create a cumulative frequency graph.

1.

2.

3.

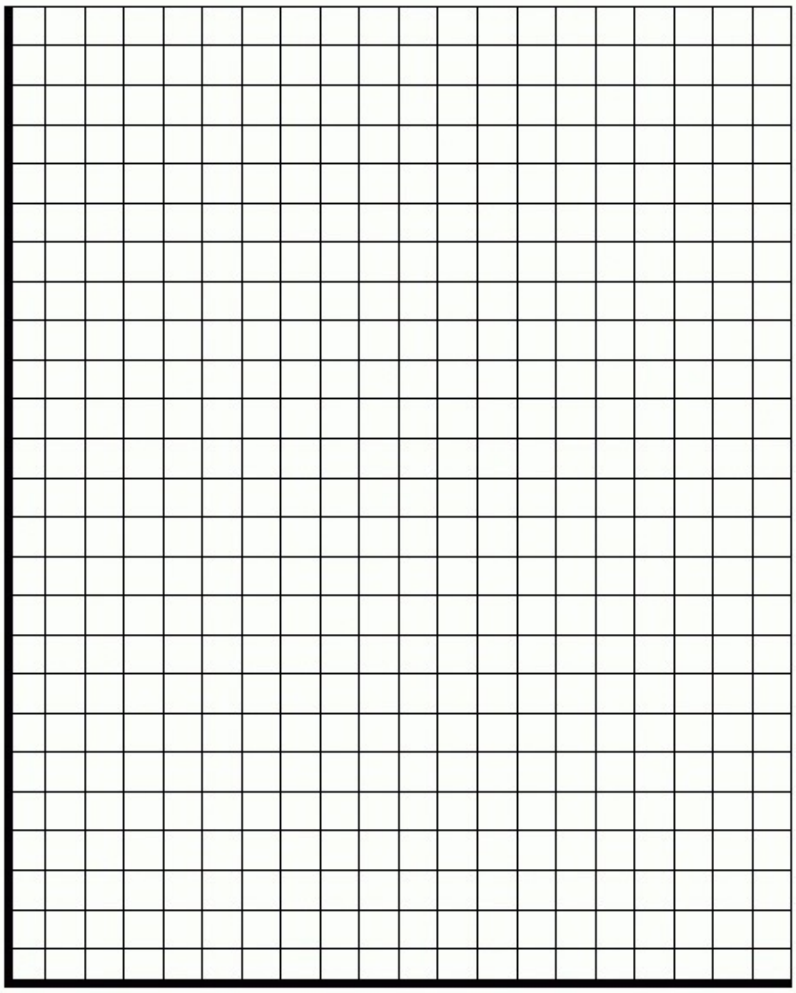
4.

5.

Example 6: Create a cumulative relative frequency graph from the information in example 2.

class(bins)	Frequency	Relative Frequency	Cumulative Relative Frequency

Cumulative Relative Frequency Graphs



We will explore how to extract meaningful information from these types of graphs later in this unit.