(A) Lesson Context

BIG PICTURE of this UNIT:	• How do we analyze and then make conclusions from a data set? (Math) • How do I present my data and the outcomes of my analysis? (Math) • How do I use data & statistics to make decisions? • How do I decide on the validity/reliability of my data? Of my analysis? Of my conclusions? Of my decision?

CONTEXT of this LESSON:	Where we've been Using data & visual representations, present your current understandings of what Statistics is	Where we are How do we prepare and analyze frequency histograms, frequency polygons and cumulative frequency?	Where we are heading How do I analyze and make conclusions from a data set, in whatever way this data gets presented?

(B) Lesson Objectives:

a. Starting from a set of raw data, prepare a grouped frequency table – using absolute and relative frequencies
b. Use either the grouped frequency tables or the histograms to prepare frequency polygons
c. Use the grouped frequency tables, calculate the cumulative frequencies and prepare cumulative frequency graphs (or ogives)
d. Introduce simple analysis questions, which can be answered from any of these visual representations, most of which involve percentiles.

(C) Misleading Graphs

You are going to be presented with 4 slides showing statistical information via graphs. You are asked to record your ideas about "What's wrong with this Picture"

Slide #1	Slide #2
Slide #3	Slide #4

(D)Opening Exercise/Review ➔ Below is a frequency table for 3 different classrooms' test scores.

Score	Frequency		
	Class A	Class B	Class C
0-9	0	0	0
10-19	1	0	1
20-29	0	0	5
30-39	0	0	7
40-49	0	1	2
50-59	1	1	2
60-69	4	2	1
70-79	9	3	1
80-89	3	6	1
90-100	1	4	0
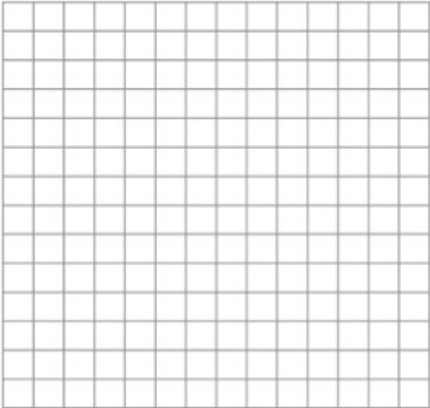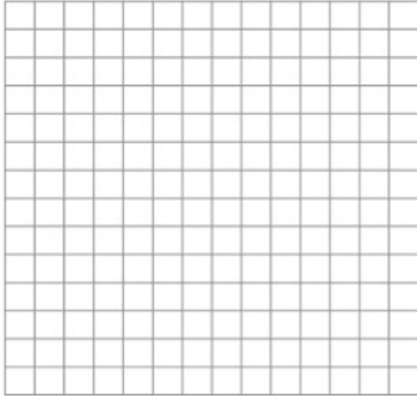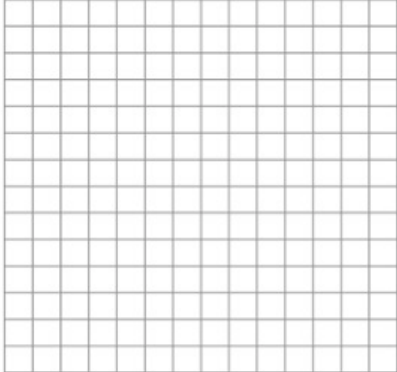
a. How many students are in each class? How do you know?

b. Please create three sets of data that will match the given frequency tables.

Class A

Class B

Class C

c. Create Frequency Bar Graphs for each class.

Class A	Class B	Class C
1 Initial Observation for each class.		
2 Conclusions for each class.		
3 Questions for each class about the data, or data collection.		
Circle one for each class that best describes the data distribution.		
Class A	Class B	Class C
Positively Skewed?	Positively Skewed?	Positively Skewed?
Negatively Skewed?	Negatively Skewed?	Negatively Skewed?
Symmetrical Data?	Symmetrical Data?	Symmetrical Data?
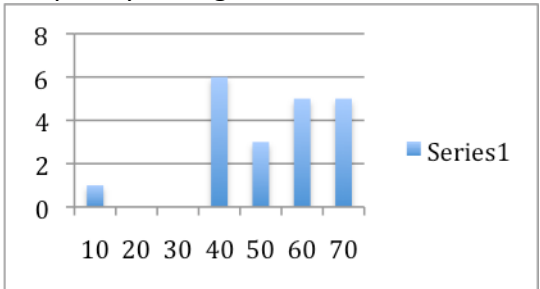
Do any of the data points stand out to you?
   (A) Outliers
   a. Go online and look up the term "Outlier" Please give a definition of this term in your own words, and then given examples of this term visually, as well as in a set of data.

Outlier	
Definition:	
Visual Example	Example with a data set

   b. Given the data representation below, fill out the rest of the table.

Frequency Chart	Frequency Histogram
X							
Y							
Actual Data: Based off of the Histogram	Stem and Leaf Chart
Outliers:	Average:
Story Behind the Data?	
Story Behind the Outlier?	
Questions you may have about this problems?	

(E) Frequency Distribution Tables ➔ Example #1

Prepare and use frequency distribution tables (using both frequencies & relative frequencies) to create (i) histographs, (ii) frequency polygons and (iii) cumulative frequency graphs

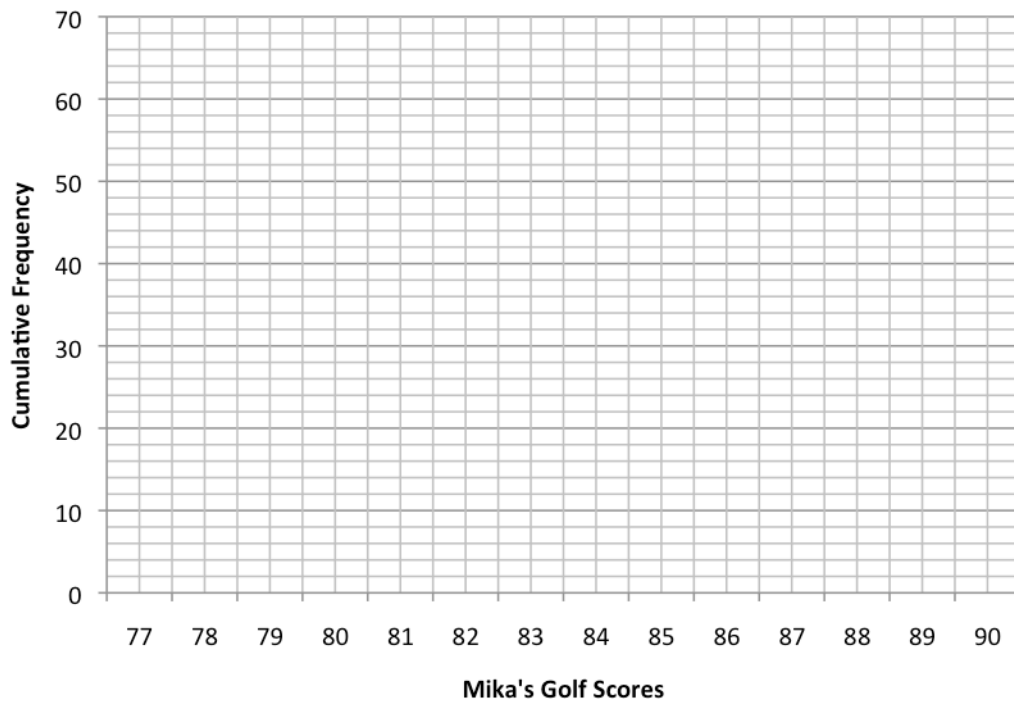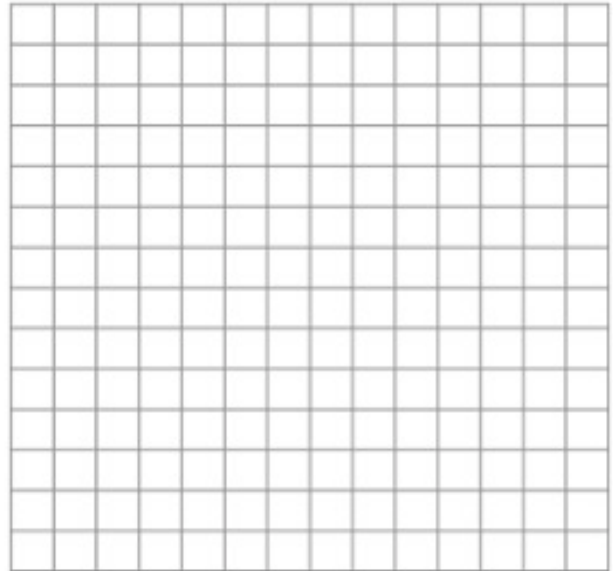Example #1 – FDT of ages of 200 first year college students at Juan Fine University

age of students	number	cum. Freq.
16	0	
17	3	
18	72	
19	62	
20	28	
21	11	
22	9	
23	5	
24	4	
25	6	
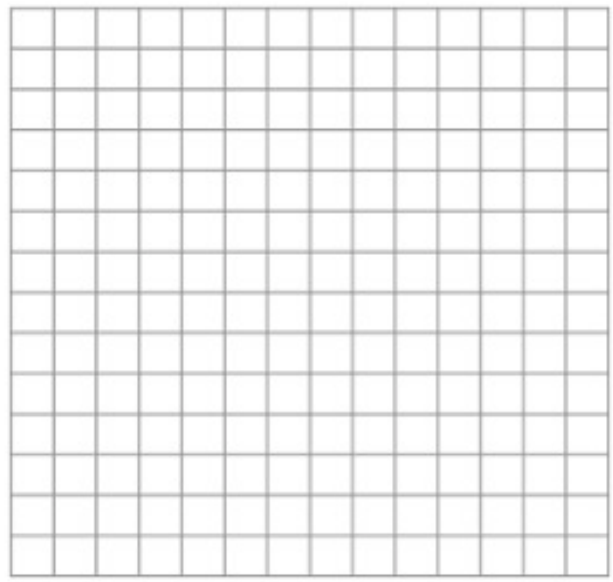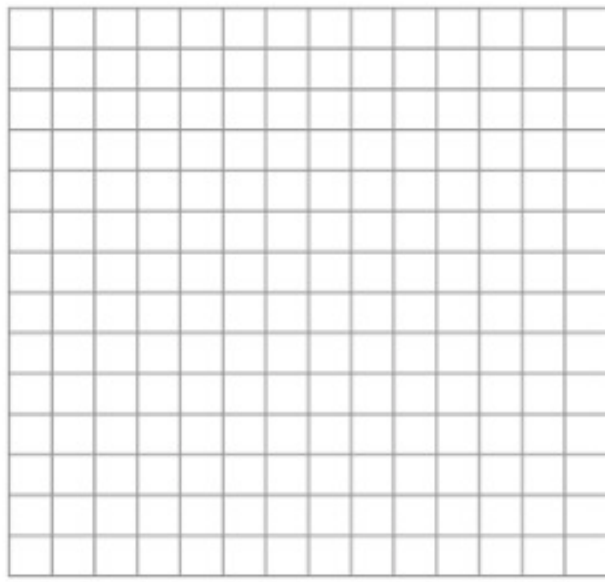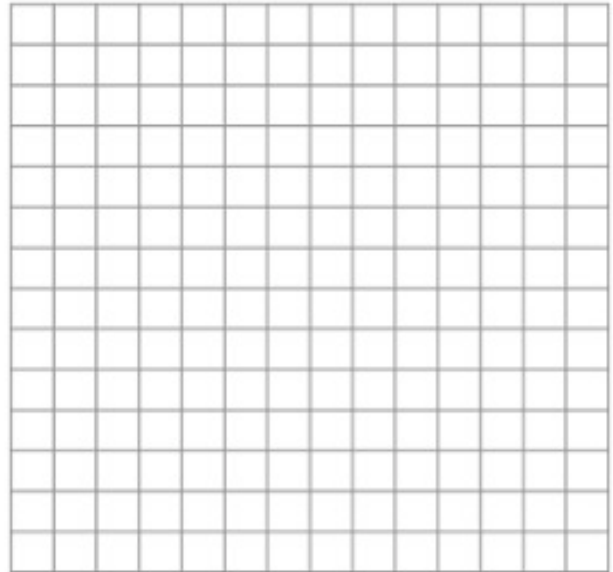
Example #2 – Mika's golf scores this past summer

a. Prepare a Frequency Histogram, frequency Polygon & CFG

Mika's Golf Scores	number	cum. Freq.
77	0	
78	1	
79	3	
80	0	
81	5	
82	7	
83	8	
84	9	
85	10	
86	8	
87	7	
88	3	
89	2	
90	1	

(Cumulative Frequency graph grid: y-axis labeled "Cumulative Frequency" from 0 to 70 in increments of 10; x-axis labeled "Mika's Golf Scores" from 77 to 90)

Example 3 - The length of 40 insects of a certain species were measured correct to the nearest millimeter. The frequency distribution is given below:

Lengths (mm)	Frequency (f_i)	Cumulative frequency
$25 \le L < 30$	2	
$30 - 35$	4	
$35 - 40$	7	
$40 - 45$	10	
$45 - 50$	8	
$50 - 55$	6	
$55 - 60$	3	

a. Construct a cumulative frequency table for the given data.
b. Draw a cumulative frequency curve for the data.
c. Estimate from the curve
   (i) the number of insects that were less than 43.5 mm long,
   (ii) the percentage of insects that were of length 37.5 mm or more,
   (iii) the value of k, if 75% of the insects were less than k mm long.
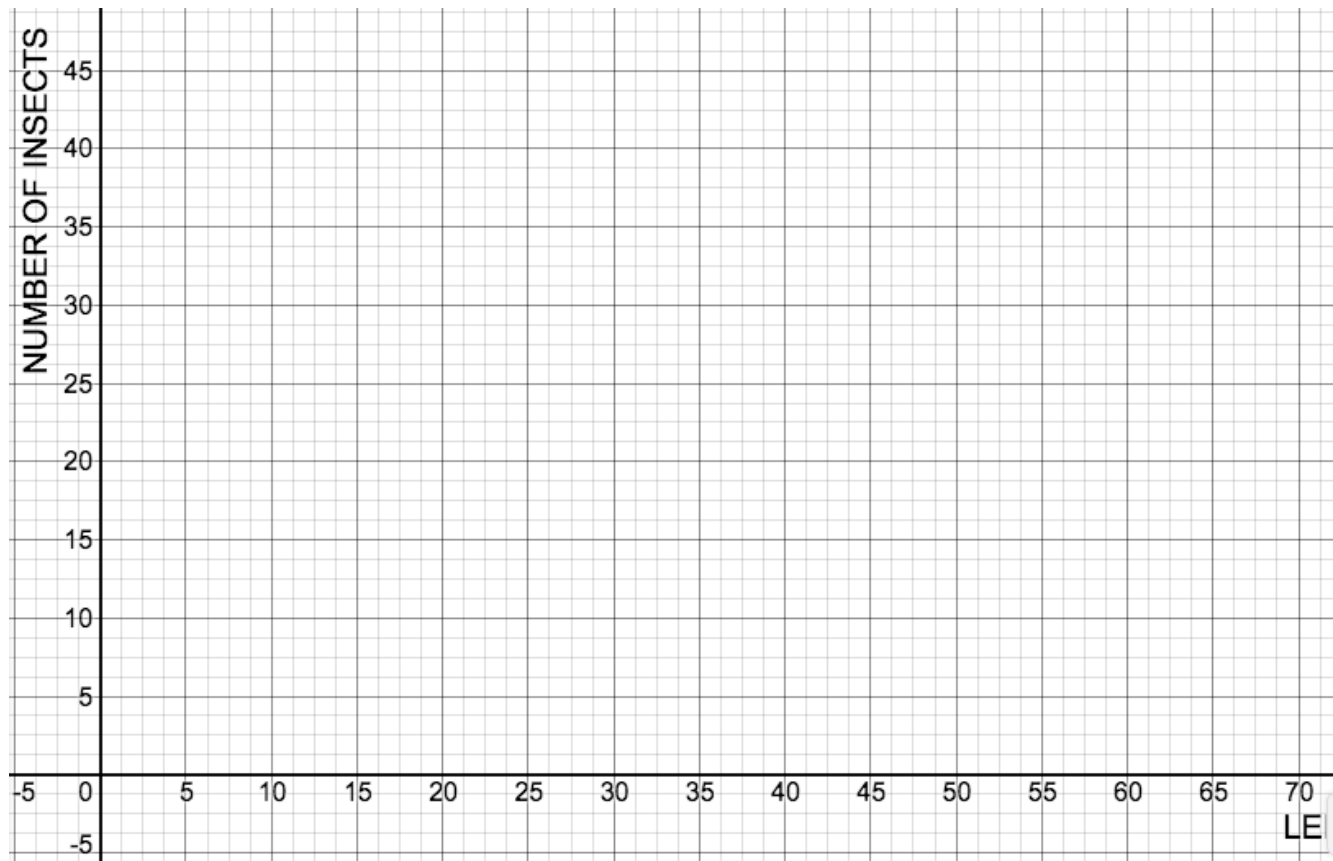
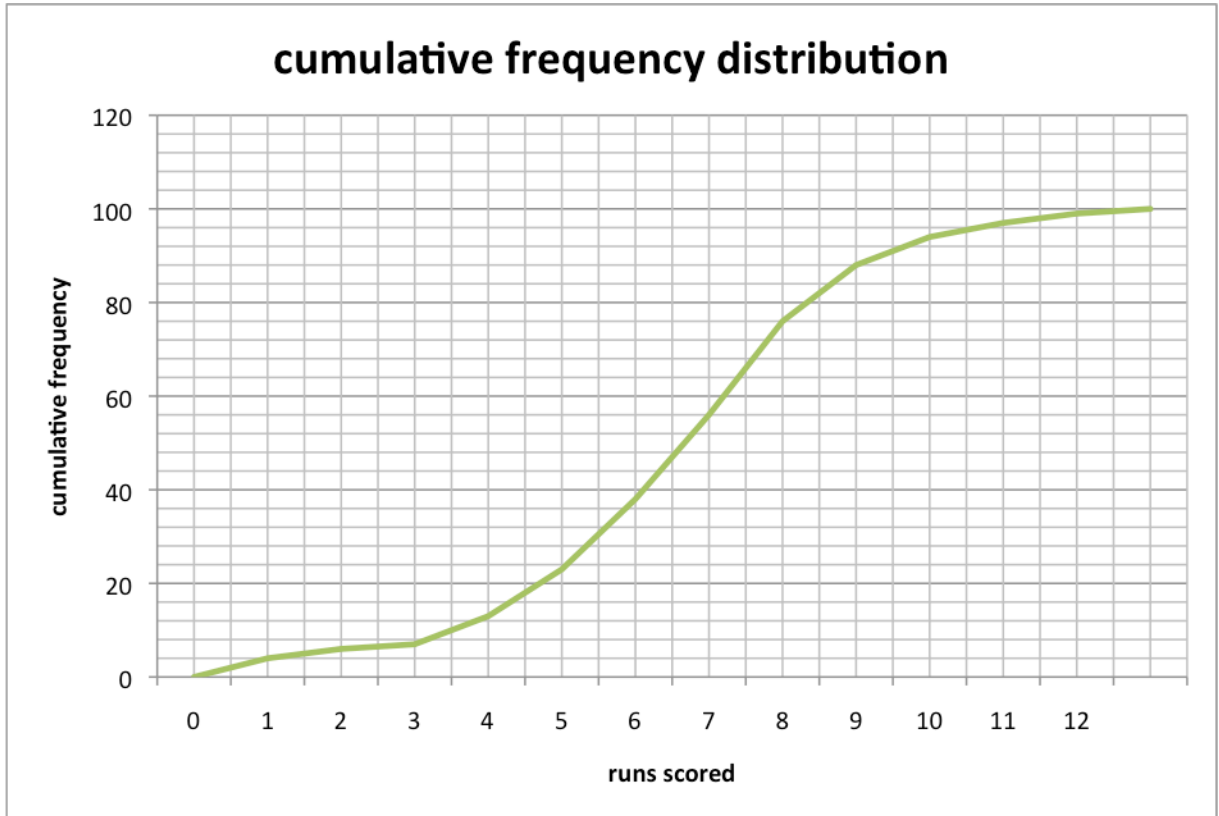## Example #4 – siblings of students in Mr. S's Grade 10 classes

      a.   55% of the students in Mr S's classes have at least …………… siblings (according to the ogive)

      b. …….. % of the students had at least 3 siblings

(A)

Number of children	number	cum. Freq.
-1	0	0
0		
1	19	
2		46
3		
4		55
5	2	
6		
7		60
8	0	60

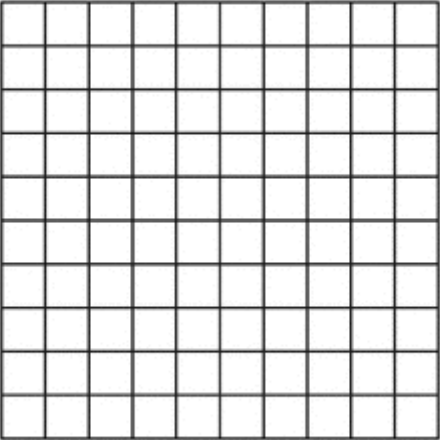## Example #3 – Runs scored by Mr. Nicols baseball teams at ISM over the years
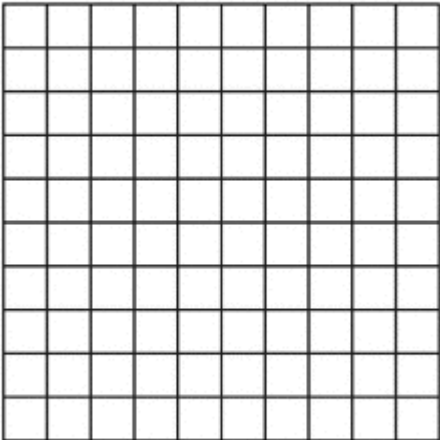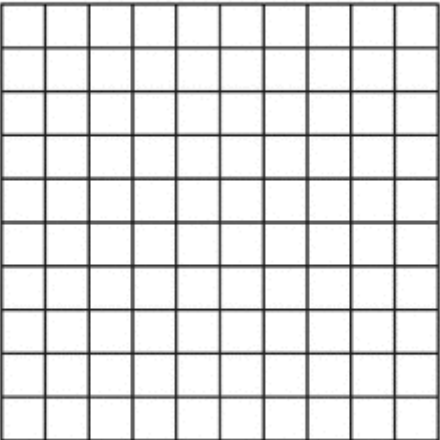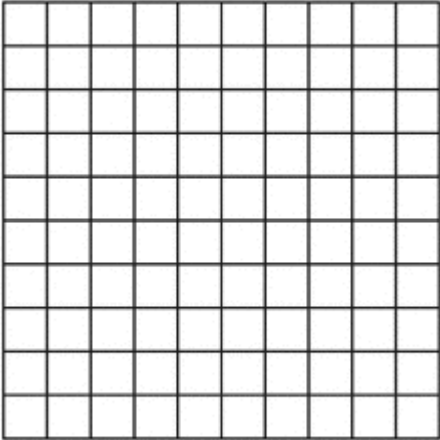
a. 43% of the time, Mr. Nicol's baseball teams scored ……… runs (according to the ogive)

b. In …….. % of the games, the team scored at least 5 runs

cumulative frequency distribution

Runs in Baseball Game	number	cum. Freq.	Histogram
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

Prepare Histograms & Cumulative Frequency Graphs from the following data sets (each of which show different types of data distributions ➔ Let's say these data sets represent IM2 Final Exam scores from the past 4 years at CAC (Work in Groups of 4 to complete this activity)

IM2 SEM 2 Exam Scores		Frequency Histogram	CFG
0 ≤ M < 10	0		
10 – 20	0		
20 – 30	0		
30 – 40	0		
40 – 50	7		
50 – 60	16		
60 – 70	28		
70 – 80	27		
80 – 90	15		
90 - 100	7		

0 ≤ M < 10	0		
10 – 20	2		
20 – 30	3		
30 – 40	4		
40 – 50	3		
50 – 60	6		
60 – 70	12		
70 – 80	18		
80 – 90	33		
90 - 100	19		

0 ≤ M < 10	0
10 – 20	11
20 – 30	26
30 – 40	21
40 – 50	15
50 – 60	13
60 – 70	12
70 – 80	2
80 – 90	0
90 - 100	0
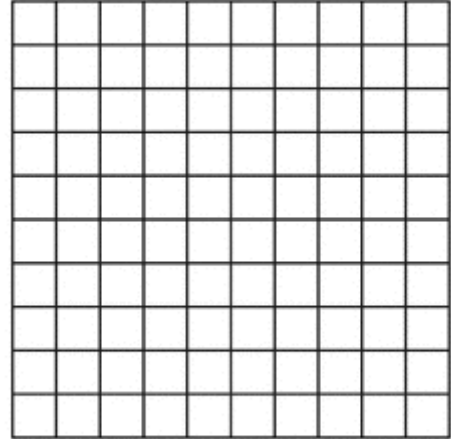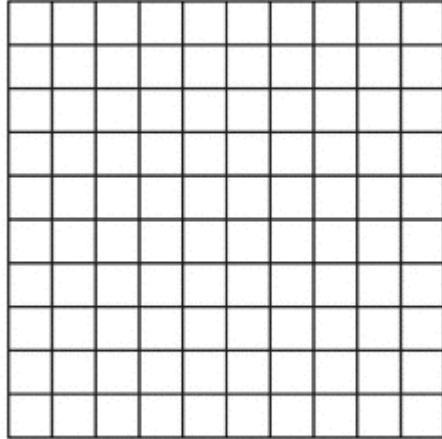
0 ≤ M < 10	2
10 – 20	15
20 – 30	20
30 – 40	12
40 – 50	3
50 – 60	2
60 – 70	10
70 – 80	20
80 – 90	14
90 - 100	2