IM2 Problem Set 3.2 - Working with Visual Representations of Data

BIG PICTURE of this UNIT:	• How do we analyze and then make conclusions from a data set? • How do I present my data and the outcomes of my analysis? • 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?

Part 1 - Skills Review

1. Find the mean, median and mode of these data set:

   a. 7,13,18,24,3,9,18
   b. 24,15,18,20,18,22,24,26,18,26,24

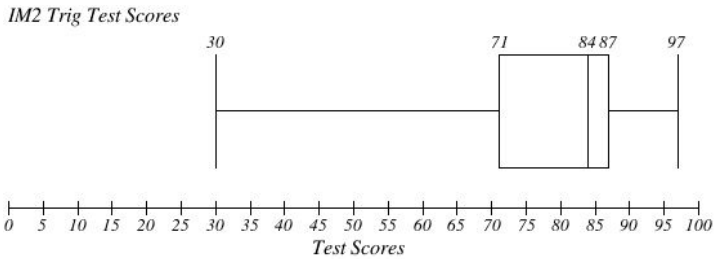
2. The average weight of 11 players on a basketball team is 80.3 kg. A new player joins the team and the average weight on the team goes up to 81.2 kg. Find the weight of the new player.

3. The following set of test scores on a Trig test came from Mr S's IM2 class last year.

   18,27,34,52,54,59,61,68,78,82,85,87,91,93,100

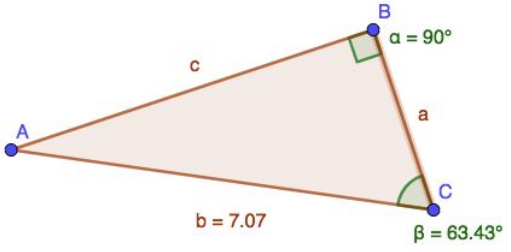
   a. Find the range, the median, Q_1 and Q_3 and the interquartile range of these test scores.
   b. Is the score of 18 an outlier?

   Below, are the results of Mr. R's IM2 class from last year on the same test.



   c. Compare the interquartile ranges of the two classes as well as the medians. Which class do you think performed better on the assessment? Give reasons for your choice.

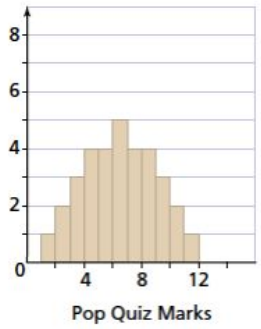
4. Solve the triangle shown in the diagram.



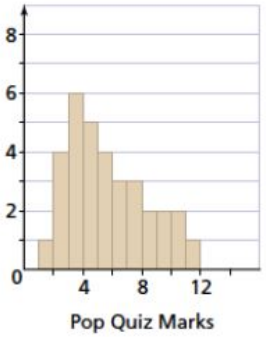
Part 2 - Application Problems with Visual Representations of Data

1. Given the following histograms of class results in 4 four quizzes

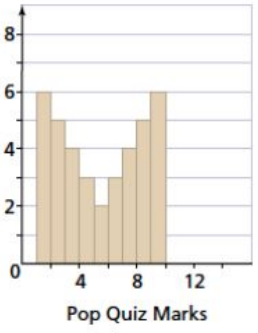
i)



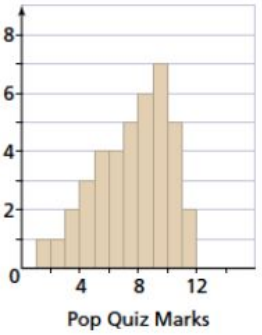
ii)



iii)



iv)



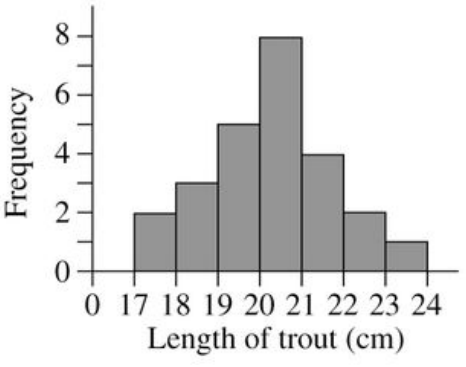
   a. Determine the mean, median and mode of each quiz.
   b. The shapes of the graphs of data distributions are categorized as symmetrical, skewed left (or skewed negatively) or skewed right (skewed positively). Categorize the four graphs accordingly.

2. The chart to the right represents the distribution of salaries at a local company.

Salary ($)	Number of Employees
18 000–20 999	4
21 000–23 999	16
24 000–26 999	14
27 000–29 999	7
30 000–32 999	3
33 000–35 999	0
36 000–38 999	0
39 000–41 999	0
42 000–44 999	2
45 000–47 999	0
48 000–50 999	1

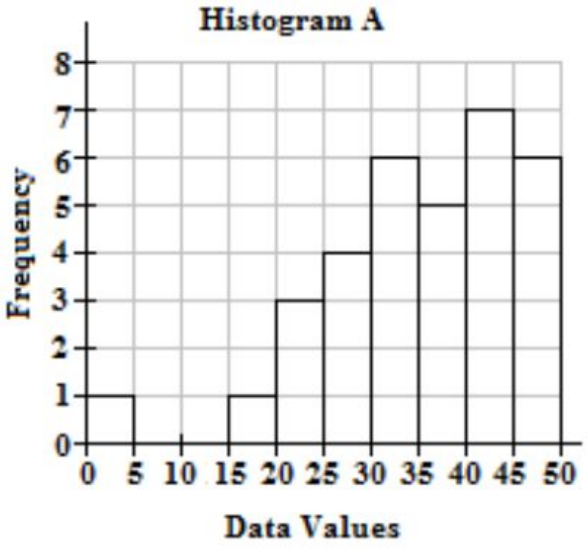
   a. Calculate the median and modal salary interval.
   b. Calculate the mean salary.
   c. Prepare a frequency histogram of the salaries.
   d. Hence, prepare a frequency polygon of the salaries.

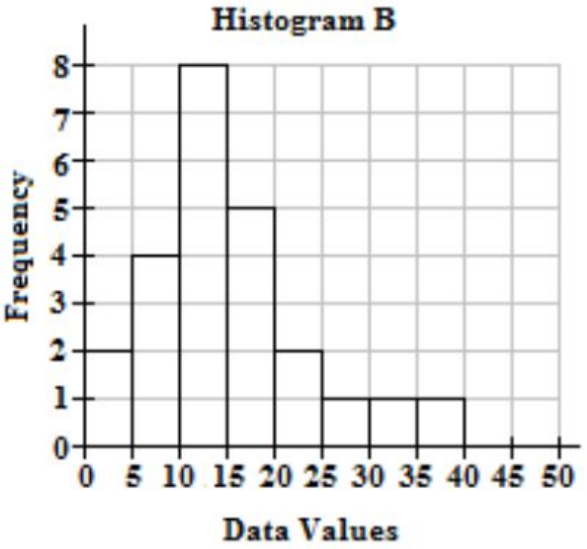
3. The following data give the lengths in centimetres of 25 red finned trout living in Lake Eildon in Victoria.



   a. Determine the mean, median and mode.
   b. Is the data set skewed?
   c. How probable is it that a fish in the lake has a length:
      i. Between 21 cm and 22 cm?
      ii. Between 18 cm and 21 cm?
      iii. Estimate the length of a fish whose length is in the lower quartile.

4. Here are two histograms showing the number of spectators at CAC sporting events; Histogram A shows student attendance at football matches and Histogram B shows attendance at volleyball matches.





   a. Which distribution had collected more data? Show/explain your reasoning.
   b. Which distribution has a larger range? Show or explain your reasoning.
   c. Determine the average number of students attending football matches and the average number of students attending volleyball matches.
   d. Which distribution is more likely to have a shape described as "skewed right?"
   e. Which distribution is more likely to have a higher median than mean? Explain why this would happen.

5. Use the **cumulative frequency table** below to answer the following questions about Mr Clauzet's French class.

Scores on a French Test

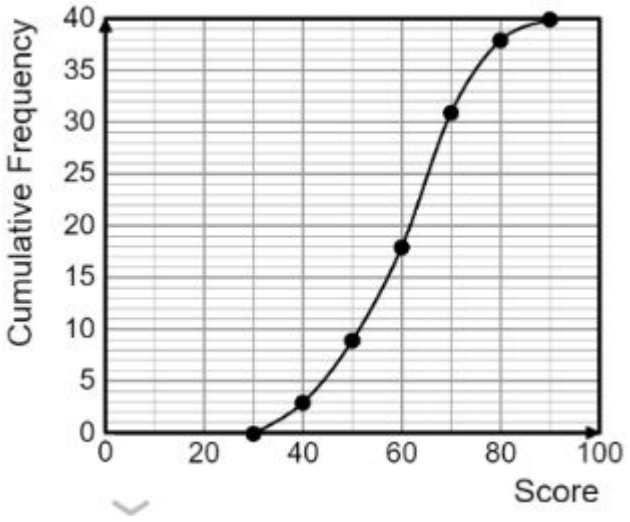
Interval	Cumulative Frequency
50-99	30
50-89	24
50-79	12
50-69	12
50-59	2

   a. How many students are in the class?
   b. How many students received a test score between a 70 - 79?
   c. How many students received a test score between a 60 - 69?
   d. Prepare a frequency histogram of the data set.

6. The 9 students in my F block class scored an average of 72% on the last test, while the 18 students in my A block class scored an average of 82% on the same test. What was the average test score from all the students in those 2 classes?

7. Introducing **cumulative frequency graphs**. The test marks of 40 students are shown in a grouped frequency table as well as presented in a cumulative frequency graph. Use the graph to complete the frequency table.

Score, x%	Freq.	Cumulative Frequency
$30 < x \leq 40$	3	
$40 < x \leq 50$	6	
$50 < x \leq 60$	9	
$60 < x \leq 70$	13	
$70 < x \leq 80$	7	
$80 < x \leq 90$	2	



a. Use the graph to answer the following questions:

   i. Estimate the median test mark.
   ii. Determine the score of the top quartile of the students on this test (top 25%).
   iii. Mr S sets the "passing grade" on the test to be 45%. Estimate how many students passed the test.

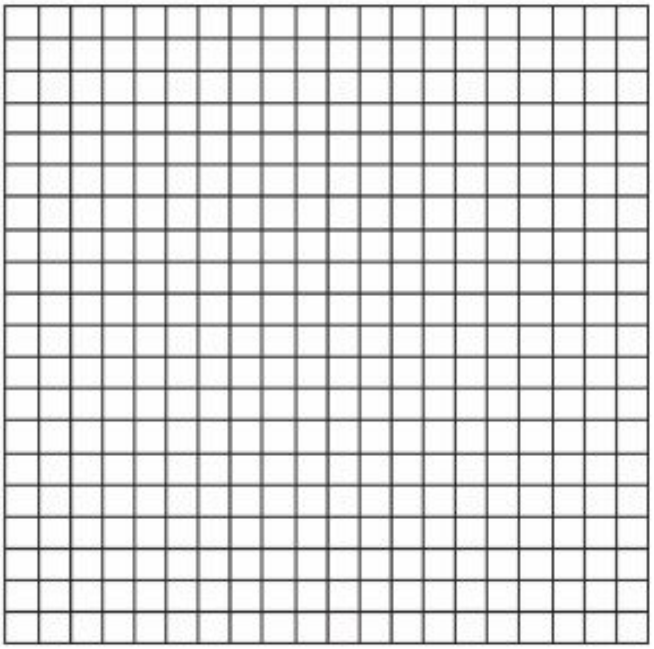
b. Use the data table to calculate an estimate for the mean test mark

8. The following data consists of the weights, in pounds, of 30 adults:

   195, 206, 100, 98, 150, 210, 195, 106, 195, 168, 180, 212, 104, 195, 100, 216, 195, 209, 112, 99, 206, 116, 195, 100, 142, 100, 135, 98, 160, 155

   Using the data, complete the accompanying cumulative frequency table and construct a cumulative frequency histogram on the grid below.

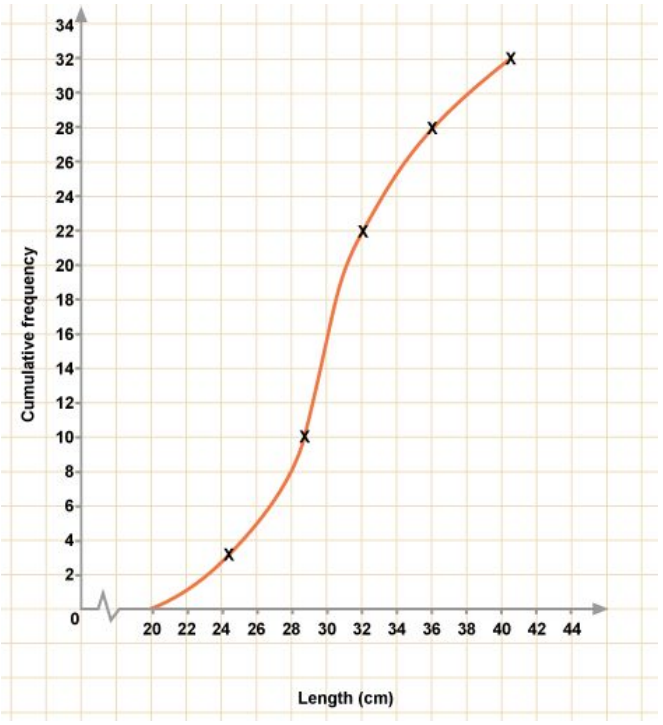
Interval	Frequency	Cumulative Frequency
51–100		
101–150		
151–200		
201–250		



9. Here is a cumulative frequency graph, showing the lengths of fish that Mr S observed on his last diving trip in the Red Sea.

   a. Use the graph to complete the following frequency table

interval	frequency	Cumulative frequency
$20 \leq x < 24$	3	3
$24 \leq x < 28$		8
$28 \leq x < 32$		
$32 \leq x < 36$	6	
$36 \leq x < 40$		32



   b. Find the median length of fish.
   c. Find the quartile lengths of the fish.
   d. How many fish had lengths between 26 cm and 31 cm?