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DepED
DEPARTMENT OF EDUCATION

Mathematics

Quarter 4 – Module 3

Presentation of Data

ALTERNATIVE DELIVERY MODE
ADM

Mathematics – Grade 7
Alternative Delivery Mode
Quarter 4 – Module 3: Presentation of Data
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Mathematics

Quarter 4 – Module 3:

Presentation of Data

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

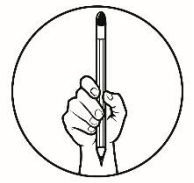
This module was designed and written with you in mind. It is here to help you master the Real-Life Problems that can be Solved by Statistics. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. However, the order in which you read them can be changed to correspond with the textbook you are now using.

The module contains a single lesson:

- Lesson 1 – Pie Chart, Bar Graph, Line Graph, Histogram and Ogive

After going through this module, you are expected to:

1. use appropriate graphs to represent organized ungrouped data: pie chart, bar graph, line graph; and
2. use appropriate graphs to represent organized grouped data: histogram and ogive



What I Know

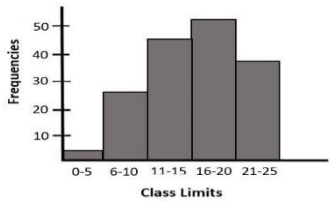
DIRECTIONS: Select the correct answer. Write the letter on a separate sheet of paper.

1. What is the visual representation of data using rectangles whose widths represent class boundaries and whose lenghts/heights represent the frequencies of the intervals?
   A. pie chart
   B. line graph
   c. ogive
   d. histogram

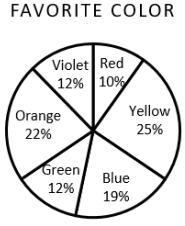
2. What graph use upper class boundaries of the cumulative frequencies.
   A. pie chart
   B. histogram
   c. line graph
   d. Ogive

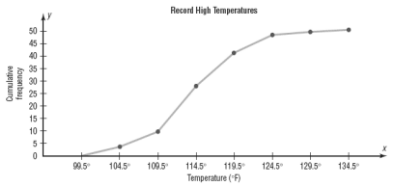
3. Which of the following illustrations shows the graph of a histogram?

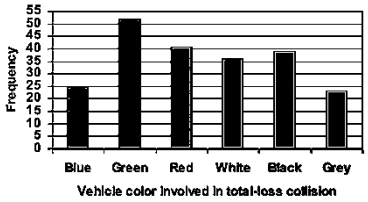
A.



B.

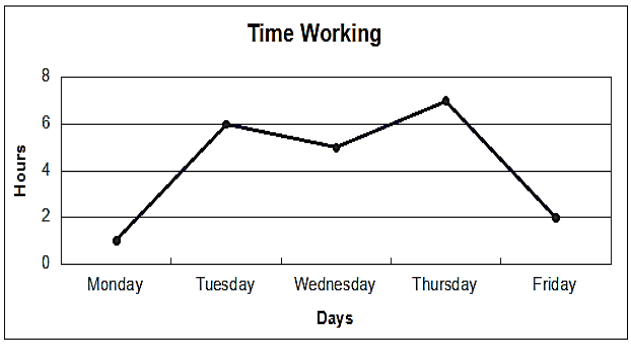


C 

D. 

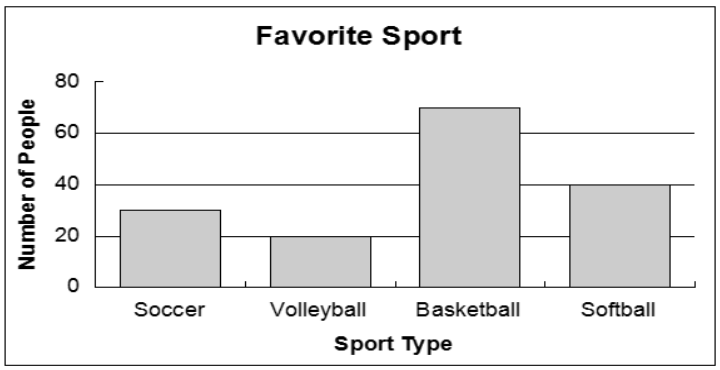
4. Last Thursday, Alpheus spent 12 hours of the day sleeping and playing, 2 hours eating and dressing, 6 hours at school, and 4 hours surfing the internet. What graph is appropriate to show the percentages of time spent on his activities in the day?
   A. bar Graph
   B. line Graph
   C. pie Chart
   D. histogram
5. What appropriate graph can be used to show the population of Region XII in the Philippines from 1989 to 2020 ?
   A. bar Graph
   B. line Graph
   C. pie Chart
   D. histogram

*For numbers 6 – 9 refer to the following graph.



6. On what day Mr. James worked the most?
   A. Monday
   B. Tuesday
   C. Wednesday
   D. Thursday
7. On what day did he work for 5 hours?
   A. Monday
   B. Tuesday
   C. Wednesday
   D. Thursday
8. How many hour/s did he work during Monday?
   A. 1
   B. 2
   C. 3
   D. 4
9. What is the total number of working hours he spent from Monday to Friday?
   A. 10
   B. 17
   C. 21
   D. 28

*For numbers 10 – 13 refer your answer to the following graph.

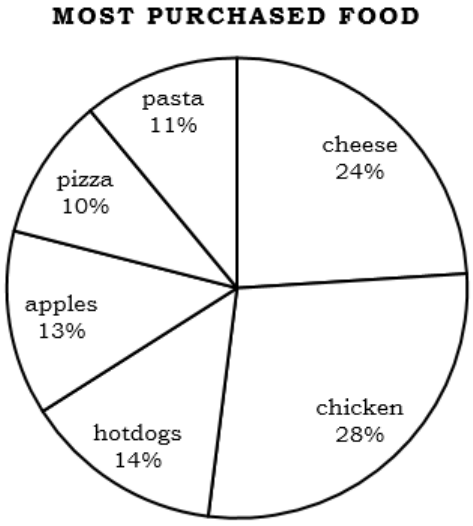


10. How many people like volleyball?
    A. 20 B. 25 C. 40 D. 65

11. Which sport got 40 votes?
    A. soccer B. volleyball C. basketball D. softball

12. Which sport was liked most?
    A. soccer B. volleyball C. basketball D. softball

*For numbers 13 – 15 refer to the following graph.



13. Which food was purchased the most?
    A. cheese B. Hotdogs C. chicken D. apples

14. If there were 200 customers in the survey, how many bought pizza?
    A. 20 B. 28 C. 48 D. 56

15. What percent of costumers bought either apples or cheese?
    a. 11% B. 13% C. 24% D. 37%

Lesson 1 Pie Chart, Line Graph, Bar Graph, Histogram and Ogive

In this lesson you will learn how to represent the data using different types of graphs.

What's In

Which frequency distribution table correctly organizes the scores below?

1, 3, 2, 2, 4, 1, 1, 2

A.

score	tally	frequency
1	III	3
2	III	3
3	I	1
4	I	1

B.

score	tally
1	III
2	III
3	I
4	I

C.

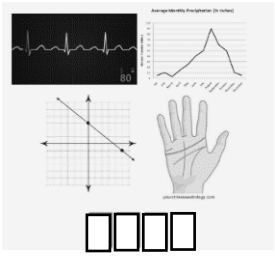
score	tally	frequency
1	I	1
2	III	2
3	II	3

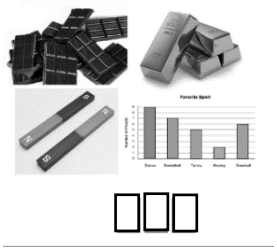
D.

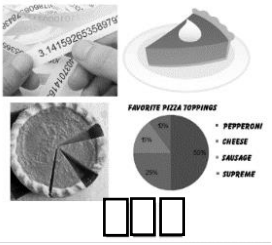
score	tally	frequency
1	III	1
2	II	2
3	II	2
4	I	1

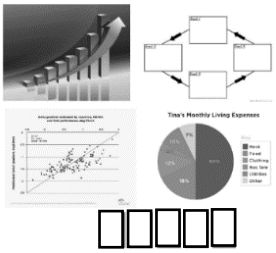
What's New

Directions : 4 Pics 1 Word: Your task is to identify four pictures and link it into one word. Write your answer in the boxes below the pictures.









What is It

GRAPHICAL REPRESENTATION OF DATA

When data are presented as graph, they are easily interpreted, and compared. As a consequence, data become more interesting to the readers

FOR UNGROUPED DATA

Data in an ungrouped frequency distribution can be presented graphically to give a better picture of the distribution. Some forms of graphs for ungrouped frequency distribution are pie chart, bar graph and line graph.

PIE CHART

A pie graph or pie chart is another visual representation of data. It is used to show how all the parts of something are related to the whole. It is represented by a circle divided into slices or sectors of various sizes that show each part's relationship to the whole and to other parts of the circle.

Example 1:
Construct a pie chart for the data given below.

Favorite Type of Movie

Type of Movie	Number of Votes
Science Fiction	1
Comedy	6
Action	4
Drama	5
Romance	4
Total	**20**

Solution:

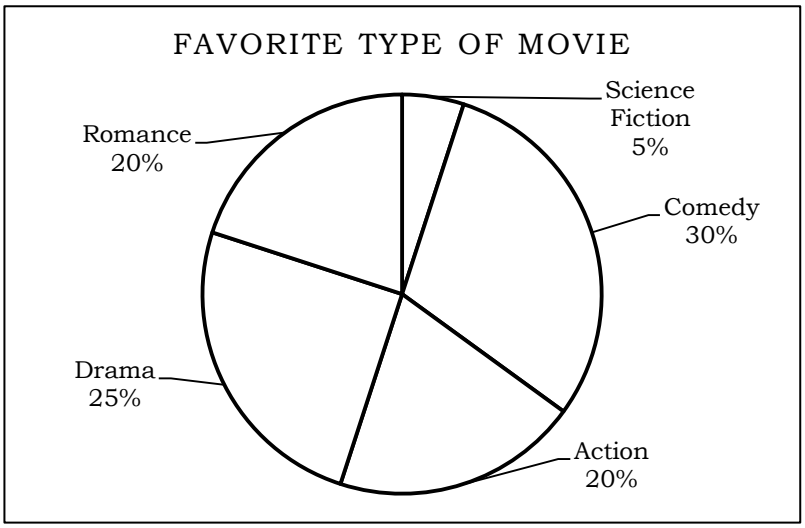
First, divide each value by the total and multiply by 100 to get a percent.

Type of Movie	Number of Votes	Percent of Each Vote
Science Fiction	1	$\frac{1}{20} \cdot 100 = \mathbf{5}\%$
Comedy	6	$\frac{6}{20} \cdot 100 = \mathbf{30}\%$
Action	4	$\frac{4}{20} \cdot 100 = \mathbf{20}\%$
Drama	5	$\frac{5}{20} \cdot 100 = 2\mathbf{5}\%$
Romance	4	$\frac{4}{20} \cdot 100 = \mathbf{20}\%$
Total	**20**	**100%**

Now multiply each part (or percent) by 360° to figure out the degrees each sector in the pie graph.

Type of Movie	Number of Votes	Percent of Each Vote	Degrees of each Sector
Science Fiction	1	$\mathbf{5}\%$	$\frac{1}{20} \cdot 360° = 18°$
Comedy	6	$\mathbf{30}\%$	$\frac{6}{20} \cdot 360° = 108°$
Action	4	$\mathbf{20}\%$	$\frac{4}{20} \cdot 360° = 72°$
Drama	5	$2\mathbf{5}\%$	$\frac{5}{20} \cdot 360° = 90°$
Romance	4	$\mathbf{20}\%$	$\frac{4}{20} \cdot 360° = 72°$
Total	**20**	**100%**	**360°**

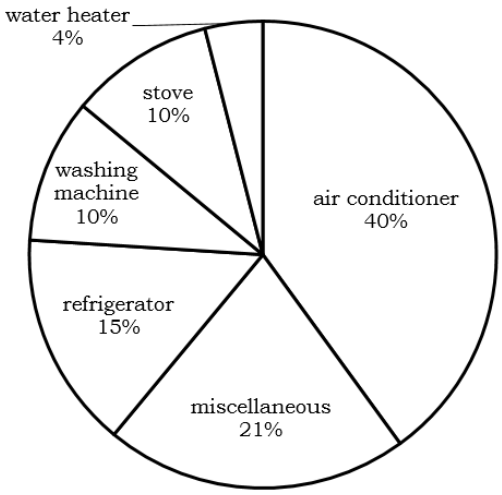
Use compass to draw the circle and a protractor to draw the "pie slices" or sectors. Label each sector of the circle and give the graph a title.



Example 2:

The amount of electricity used in a typical home is shown below. In a certain month, a home used 2 000 kwh (kilowatt-hours). Use the graph to find the amount of electricity used by the following appliances:

A. stove
B. refrigerator
b. water heater
c. air conditioner



Solution:

a. The amount of electricity used by the stove
10% of 2 000 = $\frac{10}{100} \cdot 2000$ = 200 kwh

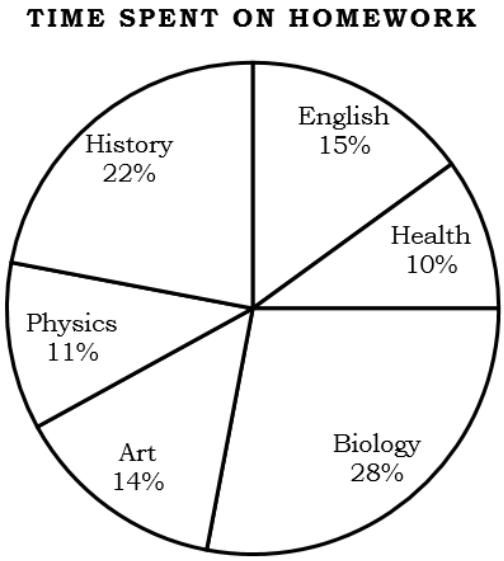
b. The amount of electricity used by the refrigerator
15% of 2 000 = $\frac{15}{100} \cdot 2000$ = 300 kwh

c. The amount of electricity used the water heater
4% of 2 000 = $\frac{4}{100} \cdot 2000$ = 80 kwh

d. The amount of electricity used by the air conditioner
40% of 2 000 = $\frac{40}{100} \cdot 2000$ = 800 kwh

Example 3:

Justin tracked the time he spent on homework per subject during one week. Answer the questions based on the pie chart below.



a. Which subject did Justin took the longest to accomplish his homework?
b. What percentage of time did Justin spend on English and Health homework?
c. Which combination of subjects was more time consuming for Justin, is it the combination of History and Physics or the combination of Biology and Art?
d. If Justin spent 100 minutes on homework, how many minutes were spent on English?

Solution:

a. Biology
b. 15% + 10% = 25%
c. Biology and Art were time consuming than History and Physics
d. 15% of 100 = $\frac{15}{100} \cdot 100$ = 15 minutes

BAR GRAPH

A bar graph uses rectangles (or bars) of uniform width to represent data, particularly the nominal or categorical type of data. The height of the rectangle denotes the frequency of the variable. There are two types of bar graph: the vertical bar graph, which is sometimes called a column chart, and the horizontal bar graph. A vertical bar graph is used to show the changes on the numerical value of a variable over a period of time.

*__Take Note:__ A bar graph can be simple or multiple. A simple bar graph represents only one unit. A multiple bar graph represents different units on the same diagram for comparison purposes.

Example 1:

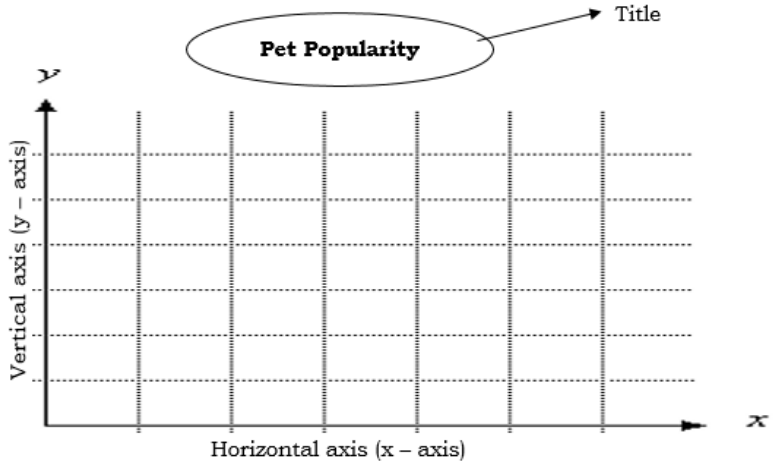
Create a simple bar graph on the data about Pet Popularity shown below

Type of Pets	Number of Pets
parrot	1
dog	3
cat	6

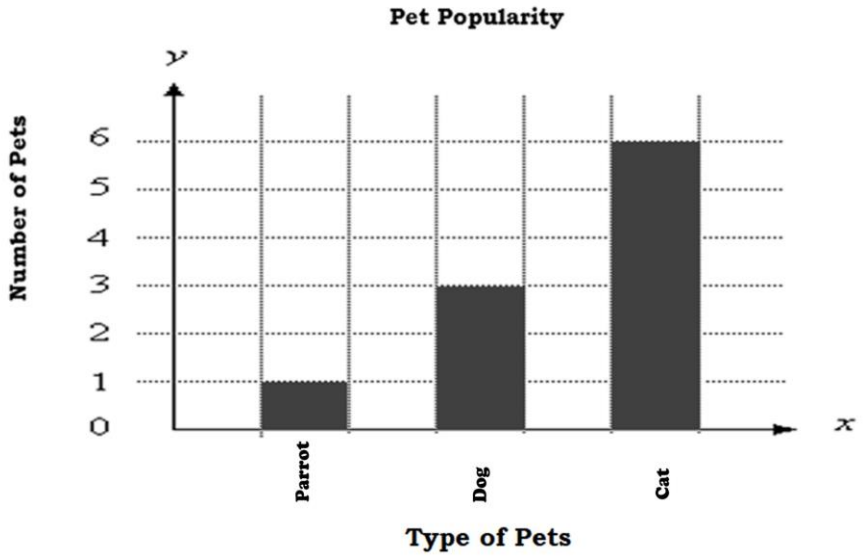
Solution:

Step 1: Decide on a title for your graph

Step 2: Draw vertical axis (y – axis) and horizontal axis (x – axis)



Step 3: Label the horizontal axis (Type of Pet)
Step 4: Write the type of pets where the bars will be drawn.
Step 5: Label the vertical axis (Number of Pets).
Step 6: Decide on scale. Consider the least and the greatest number shown on the data.
Step 7: Draw a bar to show the total for each item.



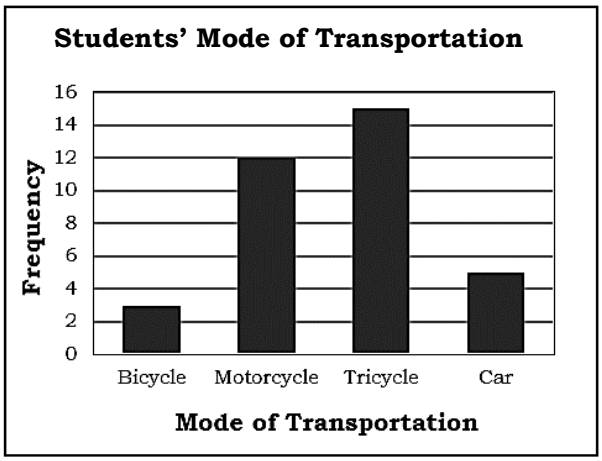
Example 2:

Teacher Michelle conducted a survey on her advisory class, Grade 7 – Begonya, about their mode of transportation in going to school. The results are shown in the table below.

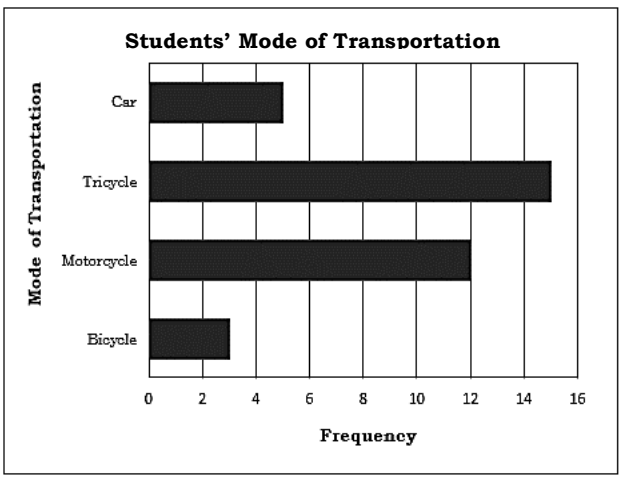
Mode of Transportation	Frequency
bicycle	3
motorcycle	12
tricycle	15
car	5

Solution:

Using Vertical Bar Graph

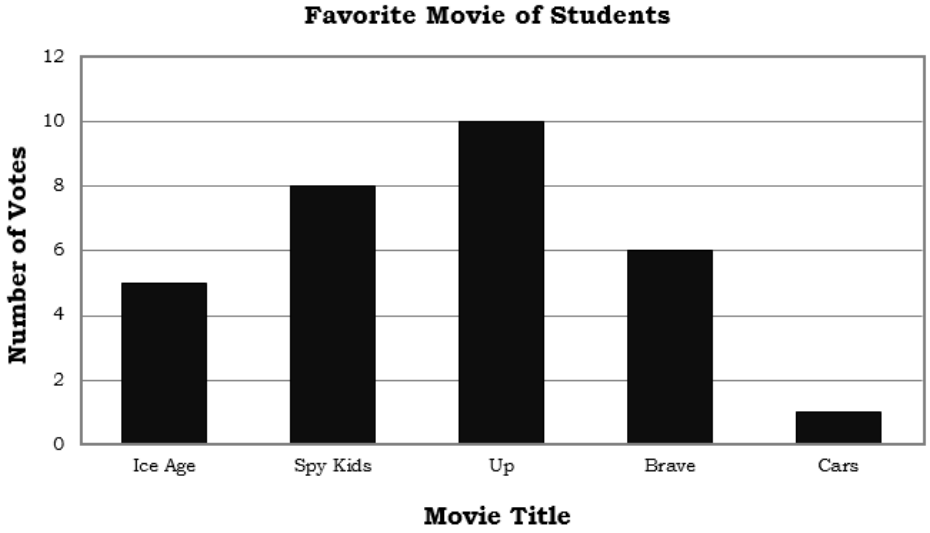


Using Horizontal Bar Graph



Example 3:

Use the bar graph to answer each question.



a. Which movie receives exactly 5 votes?
b. Which movie receives the fewest votes?
c. What is the combined number of people who voted for Up and Brave?
d. How many more votes did Spy Kids receive than Brave?
e. What was the total number of votes of all movie title?

Solution:

a. Ice Age receives exactly 5 votes.
b. Cars receives the fewest votes.
c. The combined number of people who voted for Up and Brave is 16 (10 + 6 = 16).
d. There are 2 more votes (8 – 6 = 2) Spy Kids received than Brave.
e. The total number of votes of all movie title is 30 (5 + 8 + 10 + 6 + 1 = 30).

LINE GRAPH

A line graph is used to represent changes in data over a period of time. Data like changes in temperature, income, population, and the like can be represented by a line graph. Data are represented by points and are joined by line segments. A line graph may be curved, broken, or straight.

Generally, the horizontal axis is used as the time axis and vertical axis is used to show the changes in other quantity.

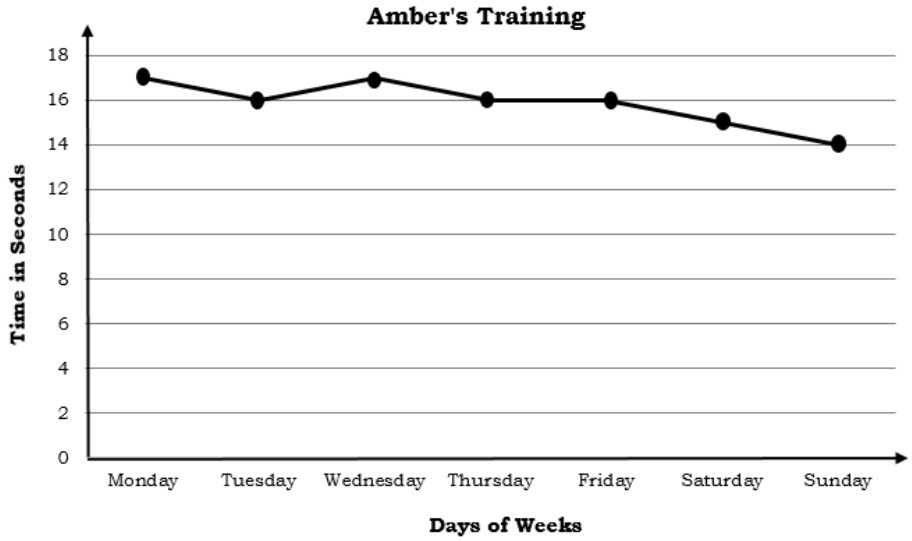
Example 1:

Amber wanted to join in a 100-meter dash contest in his school. To track her performance whether she is improving or not, her mother recorded her running time from Monday to Sunday as shown in the table below. Create a line graph on Amber's training.

Days of Weeks	Time (seconds)
Monday	17
Tuesday	16
Wednesday	17
Thursday	16
Friday	16
Saturday	15
Sunday	14

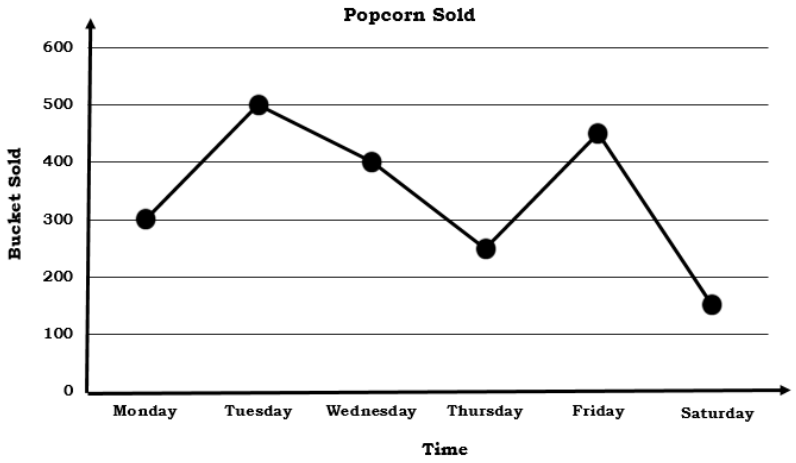
Solution:

We use horizontal axis for the days and vertical axis for time in seconds.



On which day is the fastest running time of Amber?
Solution: Sunday is the fastest running time of Amber.

Example 2:
The graph below shows the amount of popcorn sold at a theater.



Use the graph to answer the following questions.

a. Which day had the most popcorn sold?
b. From Thursday to Friday did the amount of popcorn sold increases or decreases?
c. Were fewer buckets sold on Tuesday or on Thursday?
d. What is the difference in the number of buckets sold on Wednesday and the number sold on Friday?
e. What is the total number of buckets sold?

Solution:

a. Tuesday
b. Increases
c. Thursday

f. 450 – 400 = 50
g. 300 + 500 + 400 +250 +450 + 150 = 2,050

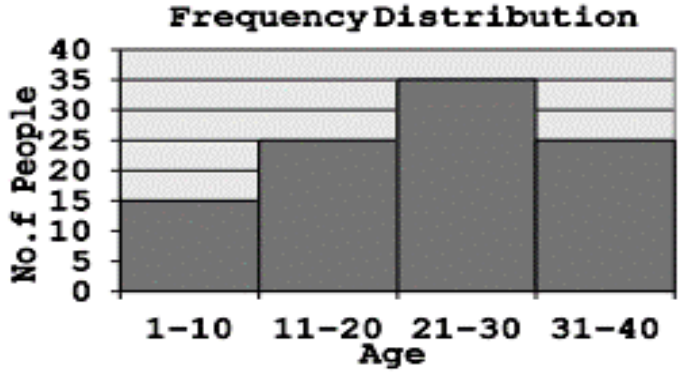
FOR GROUPED DATA

Some forms of graphs for grouped frequency distribution are the Histogram and Ogive.

HISTOGRAM

A Histogram is a bar graph that shows the frequency of data that occur within a certain interval. In a histogram, the bars are always vertical, the width of each bar is based upon the size of the interval it represents, and there are no gaps between adjacent bars. Histograms have no gaps because their bases cover a continuous range of possible values.

Example: Use the graph below to answer the questions below.



a. Which age group has the most number of people?
b. Which age group has the least number of people?
c. How many people are in the age group 11 – 20?
d. How many people are there in the age group 0 – 20?
d. How many people are older than 30?

Solution:

a. 21-30 b. 1-10 c. 25 d. 40 e.25

OGIVE

The ogive (also called the *cumulative frequency graph* or *cumulative frequency curve*) is a graph plotted from a cumulative frequency table. The following examples show how to draw a cumulative frequency curve for grouped data.

Example:

Draw a cumulative frequency graph for the frequency table below.

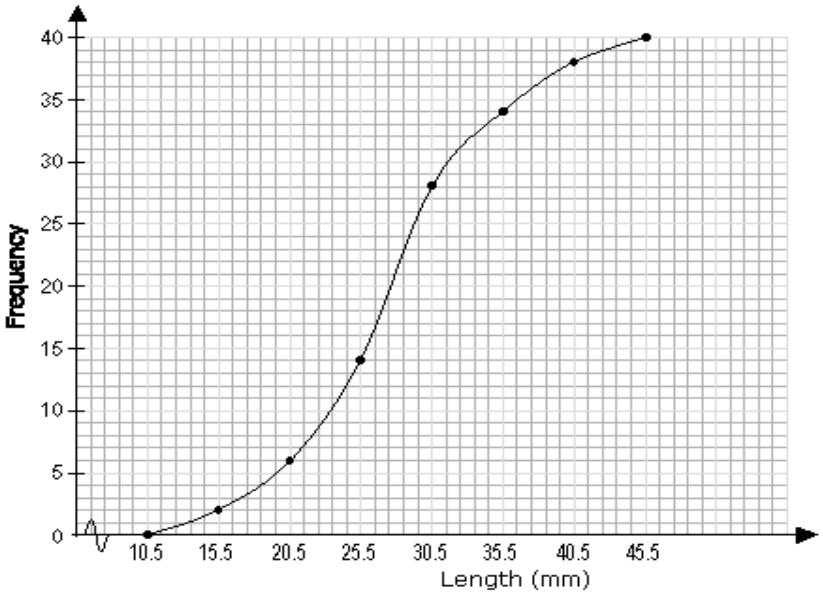
Length x (mm)	Frequency
11 – 15	2
16 – 20	4
21 – 25	8
26 – 30	14
31 – 35	6
36 – 40	4
41 - 45	2

Solution:

We need to add class with 0 frequency before the first class and then find the upper class boundary for each class interval.

Length x (mm)	Frequency	Upper Class Boundary	Length x (mm)	Cumulative Frequency
6 – 10	0	10.5	$x \leq 10.5$	0
11 – 15	2	15.5	$x \leq 15.5$	2
16 – 20	4	20.5	$x \leq 20.5$	6
21 – 25	8	25.5	$x \leq 25.5$	14
26 – 30	14	30.5	$x \leq 30.5$	28
31 – 35	6	35.5	$x \leq 35.5$	34
36 – 40	4	40.5	$x \leq 40.5$	38
41 - 45	2	45.5	$x \leq 45.5$	40

And then plot the cumulative frequency against the upper class boundary of each interval and join the point with the smooth curve.



What's More

Each of the following is the title for a graph. On a separate sheet of paper, indicate whether a **bar graph, line graph, or pie chart** would best represent the data.

_____1. Project Cost Breakdown Percentage of Han's Gallery
_____2. Population of Region XII from 2000 to 2020
_____3. Favorite Drink of a Junior High School Students
_____4. Income of ABC Company Over the Years
_____5. Percentages of Sources of Chicken in Mindanao
_____6. Male Students Who Own Bikes By Grade Level
_____7. Family Budget for a Monthly Income of P25,000
_____8. Favorite Kpop Group of Teenagers
_____9. Temperature in Koronadal City
_____10. Average Height of Girls

What I Have Learned

Directions: Match the descriptions in column A with word/s being described in column B. Write the letter of your answer in a separate sheet of paper.

Column A

_____1. Also known as cumulative frequency graph or cumulative frequency curve.

_____2. A type of graph which uses rectangles or bars of uniform width to represent data particularly nominal or categorical type of data.

_____3. A graph which is used to represent changes in data over a period of time

_____4. A graph used to show how all parts of something are related to the whole.

_____5. A graph whose bars have no gaps because their bases cover a continuous range of possible values

Column B

a. line Graph

b. pie Chart

c. bar Graph

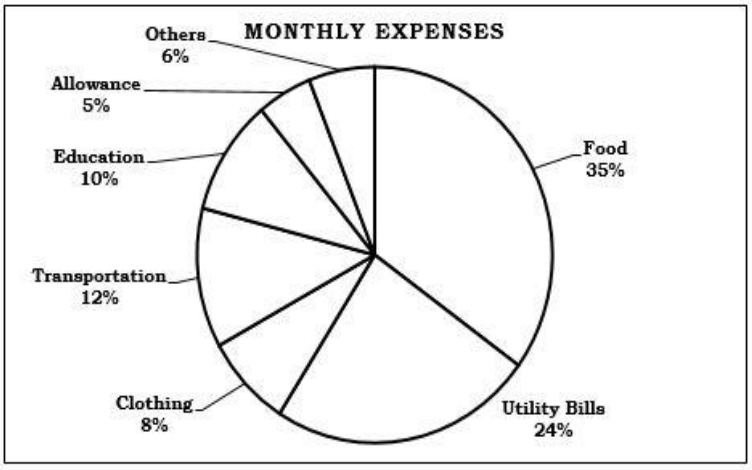
d. histogram

e. ogive

What I Can Do

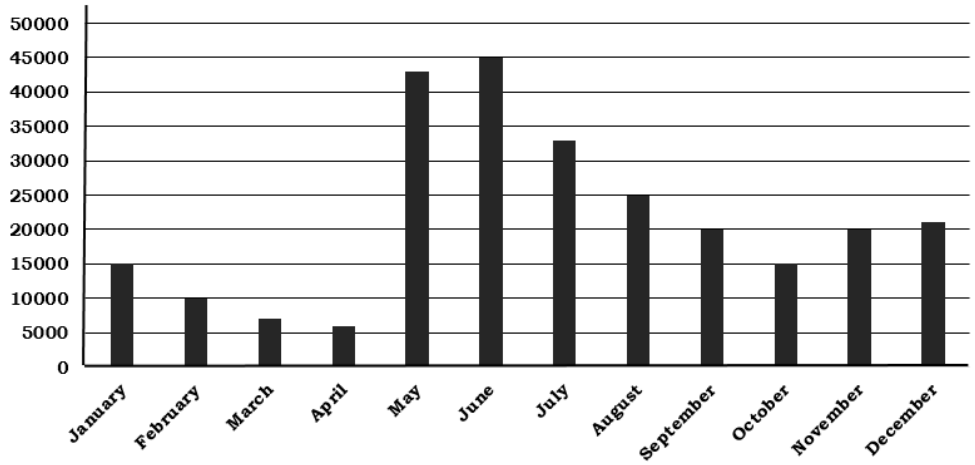
Answer the following questions based on the given graphical representation of each data.

1. Madam Rose Grace presented the monthly expenses of her family through the use of pie graph below:



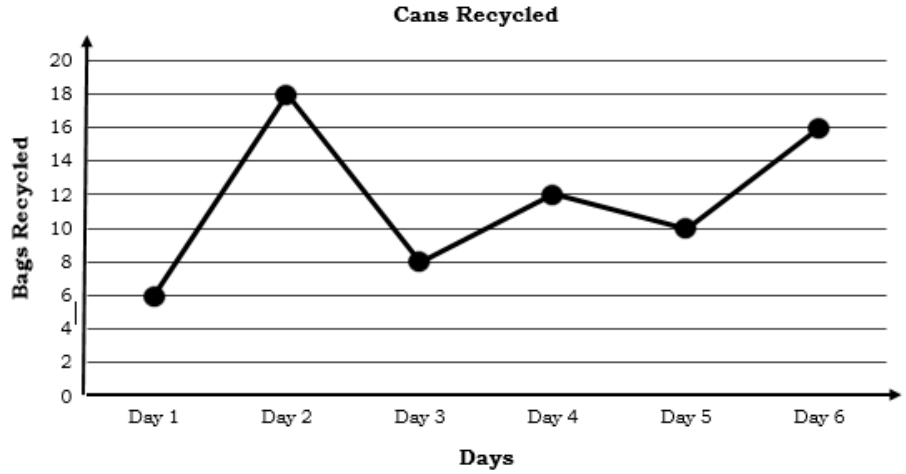
   a. If the monthly budget of Madam Rose Grace is P50,000, then how much did her family spend on each item below:
      - food
      - utility Bills
      - clothing
      - transportation
      - education
      - allowance
      - others
   b. What percentage did Madam Rose Grace allocate for the transportation in her monthly expenses?
   c. What item has the least expenses for Madam Rose Grace?

2. The graph below shows the average monthly income of a construction supply store in the year 2015.



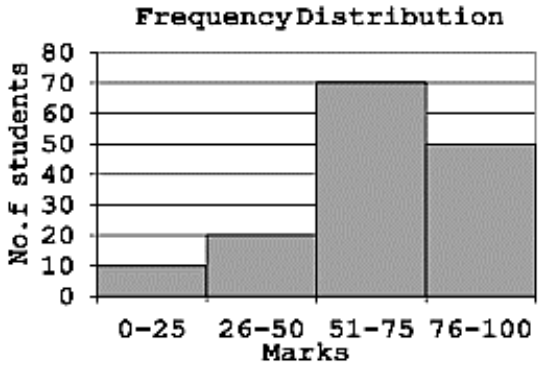
a. Which month has the highest income?
b. Which month has the lowest income?
c. What is the income of the store in November and January?
d. What is the difference between the income of the store from August to September? 17
e. What is the total income of the store from August to November?

3. The graph below shows the bags of cans recycled.



a. Which day had the fewest bags recycled?
b. Which day had the greatest number of bags recycled?
c. From Day 2 to Day 3 did the number of bags recycled increases or decreases?
d. How many bags were recycled on Day 5?
e. Were more bags recycled on Day 4 or Day 5?
f. Were fewer bags recycled on Day 3 or Day 4?

4. Refer your answer to the graph shown below.



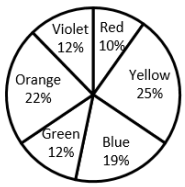
a. How many students got marks in 0-25?
b. How many students got more than 50 marks?
c. Which marks range has the least students?
d. How many students got 75 or lesser marks?
e. How many students got marks between 51 and 75?

Assessment

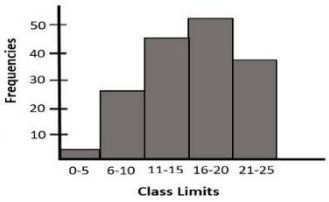
DIRECTIONS: Read each item carefully and choose the letter of the correct answer. Write your answer on a separate sheet of paper.

1. Which of the following illustrations shows the graph of an ogive?

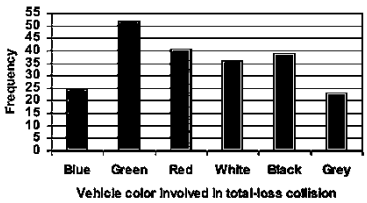
a.



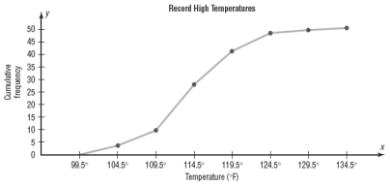
c.



b.



d.



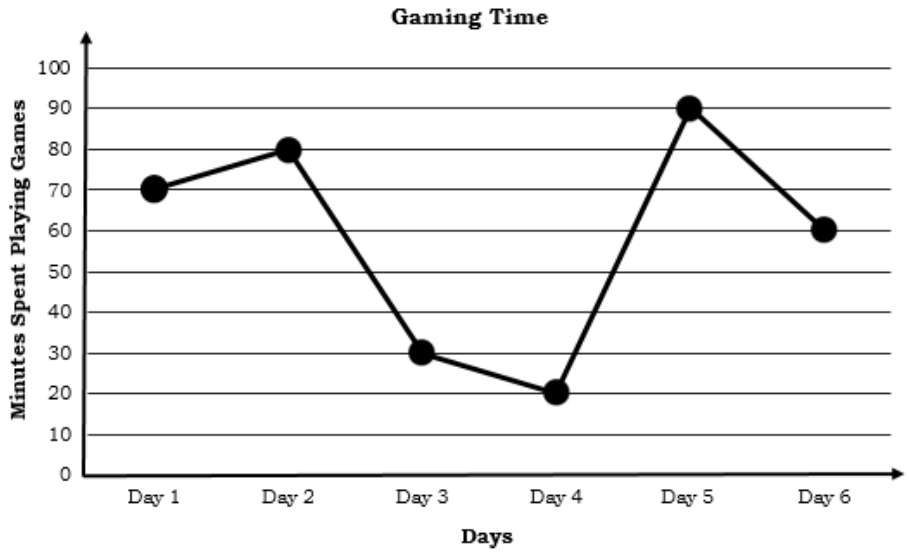
2. The visual representation of data that is used to show how all the parts of something are related to the whole.
   a. pie chart
   b. line graph
   c. bar graph
   d. histogram

3. A bar graph that shows the frequency data occur within a certain interval and there are no gaps between adjacent bars.
   a. pie chart
   b. histogram
   c. line graph
   d. Ogive

4. Last month, the amount of electricity used in Mrs. Cruz Restaurant was 2,700 kwh (kilowatt-hours). What appropriate graph must be used to show the percentage of the amount used by different appliances in her restaurant.
   a. bar Graph
   b. line Graph
   c. pie Chart
   d. histogram

5. The data is all about the sales of MHK Company from 2010 – 2020. What appropriate graph must be used to show the trend of the company over the years?
   a. bar Graph
   b. line Graph
   c. pie Chart
   d. histogram

*For numbers 6 – 8 refer to the following graph.

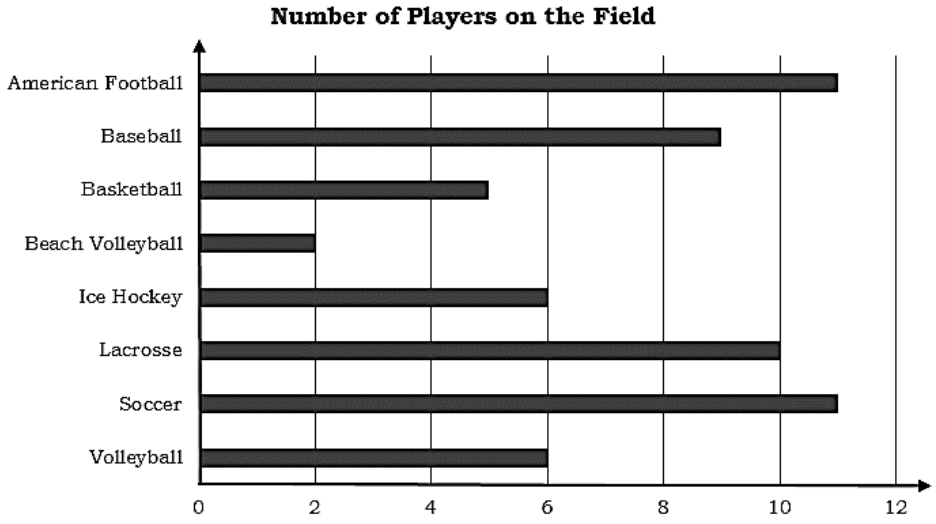


6. Which day did Johnny spend the most of time playing games?
   a. Day 1 b. Day 3 c. Day 5 d. Day 6

7. What is the difference of the time spent playing on Day 5 and Day 2?
   a. 10 b. 30 c. 20 d. 60

8. What is the total time he spent playing games?
   a. 240 b. 290 c. 320 d. 350

*For Number 9 – 11 refer to the following graph.



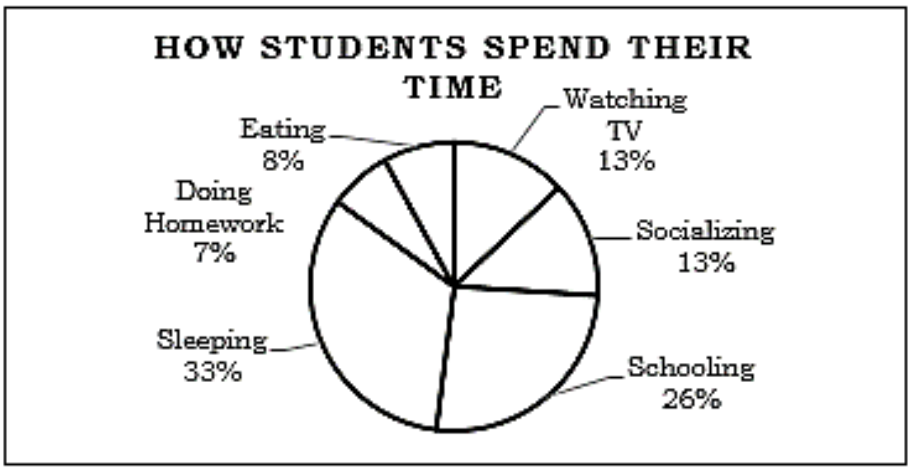
9. Which sport type has the least number of players?
   a. volleyball b. beach vol 20 l c. basketball d. baseball

10. Which sport type has 9 players?
   a. soccer b. ice hockey c. baseball d. volleyball

11. Which sports have the same number of players?
   a. ice hockey and volleyball c. lacrosse and soccer
   b. soccer and basketball d. American football and volleyball

12. How many less players does lacrosse team have than the soccer team?
   a. 1 b. 2 c. 3 d. 4

*For numbers 13 – 15, refer to the following graph.



13. Which activities do the student spent their time?
   a. eating and doing homework c. sleeping and schooling
   b. doing homework and sleeping d. socializing and w atching TV

14. Approximately how many hours a day are spent for sleeping?
   a. 6 b. 7 c. 8 d. 9

15. For every 24 hours, about how many hours are spent in socializing and watching TV?
   a. 6 b. 7 c. 8 d. 9

Additional Activities

Draw the Graph

A. Create a pie chart or pie graph on the following data shown below. Show your solution.

Grade 7 Math Teachers Advisory Class

Homeroom Teacher	Number of Students
Michelle	20
Rose Grace	38
Melanie	28
Joy	36
Josephine	42
Daisy	36
Total	200

B. Create a bar graph on the data below in a separate sheet of paper or you can use a graphing

Celebrity Types Teens Prefer in Ads

Celebrity Type	Number of Votes
sports stars	8
music stars	33
movie stars	16
animated characters	11
TV stars	12

C. Create a line graph on the given data below.

Ice Cream Sales

Days of the Week	Sales
Monday	10
Tuesday	40
Wednesday	60
Thursday	30
Friday	50
Saturday	70
Sunday	90

Answer Key

Lesson 1:
What I Can Do

1. a. food: P17,500
   utility bills: P12,000
   clothing: P4,000
   transportation: P6,000
   education: P5,000
   allowance: P2,500
   others: P3,000
   b. 12%
   c. allowance

2. a. June
   b. April
   c. P35,000
   d. P5,000
   e. P80,000

3. a. day 1
   b. day 2
   c. decreases
   d. 10
   e. day 4
   f. day 3

4. a. 10
   b. 120
   c. 0 – 25
   d. 100
   e. 70

What I Know

1. d
2. d
3. a
4. c
5. b
6. d
7. c
8. a
9. c
10. a
11. d
12. c
13. c
14. a
15. d

Lesson 1:
What's New

line
bar
pie
chart

Lesson 1:
What's More

1. pie chart
2. line graph
3. bar graph
4. line graph
5. pie chart
6. bar graph
7. pie chart
8. bar graph
9. line graph
10. line graph

Lesson 1:
What I Have
Learned

1. e
2. c
3. a
4. b
5. d

Additional Activities

2. Bar Graph

3. Line Graph

Additional Activities

1. Pie Chart

Homeroom Teacher	Number of Students	Percentage	Degree of Sector
Michelle	20	10%	36°
Rose Grace	38	19%	68.4°
Melanie	28	14%	50.4°
Joy	36	18%	64.8°
Josephine	42	21%	75.6°
Daisy	36	18%	64.8°
Total	200	100%	360°

Assessment

1. d
2. a
3. b
4. c
5. b
6. c
7. a
8. d
9. b
10. c
11. a
12. a
13. d
14. c
15. a

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https://www.onlinemathlearning.com/cumulative-frequency-graph.html

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