Monday, May 18, 2015 ~ Day 3

**Aim:**
YWBAT identify types of data and create a dot plot to represent the data set.

**Do Now:**
January 2015(25)

**HW:**
January 2015 (1-24)

Regents Review Test Wednesday
Part II

Answer all 8 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil.  [16]

25 Ms. Fox asked her class “Is the sum of 4.2 and \(\sqrt{2}\) rational or irrational?” Patrick answered that the sum would be irrational.

State whether Patrick is correct or incorrect. Justify your reasoning.
Part 1

Answer all 24 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Record your answers on your separate answer sheet. [18]

1. The owner of a small computer repair business has one employee, who is paid an hourly rate of $22. The owner estimates his weekly profit using the function \( P(x) = 8600 - 22x \). In this function, \( x \) represents the number of
   (1) computers repaired per week
   (2) hours worked per week
   (3) customers served per week
   (4) days worked per week

2. Peyton is a sprinter who can run the 40-yard dash in 4.5 seconds. He converts his speed into miles per hour, as shown below.

\[
\frac{40 \text{ yd}}{4.5 \text{ sec}} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}}
\]

Which ratio is incorrectly written to convert his speed?

(1) \( \frac{3 \text{ ft}}{1 \text{ yd}} \)
(2) \( \frac{5280 \text{ ft}}{1 \text{ mi}} \)
(3) \( \frac{60 \text{ sec}}{1 \text{ min}} \)
(4) \( \frac{60 \text{ min}}{1 \text{ hr}} \)

3. Which equation has the same solutions as \( 2x^2 + x - 3 = 0 \)?

(1) \( (2x - 1)(x + 3) = 0 \)
(2) \( (2x + 1)(x - 3) = 0 \)
(3) \( (2x - 3)(x + 1) = 0 \)
(4) \( (2x + 3)(x - 1) = 0 \)
4 Krystal was given $3000 when she turned 2 years old. Her parents invested it at a 2% interest rate compounded annually. No deposits or withdrawals were made. Which expression can be used to determine how much money Krystal had in the account when she turned 18?

(1) $3000(1 + 0.02)^{16}$  
(2) $3000(1 - 0.02)^{16}$  
(3) $3000(1 + 0.02)^{18}$  
(4) $3000(1 - 0.02)^{18}$

5 Which table of values represents a linear relationship?

<table>
<thead>
<tr>
<th>$x$</th>
<th>$f(x)$</th>
<th>$x$</th>
<th>$f(x)$</th>
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(2)  

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<td>8</td>
</tr>
<tr>
<td>3</td>
<td>27</td>
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</table>

(3)  

6 Which domain would be the most appropriate set to use for a function that predicts the number of household online-devices in terms of the number of people in the household?

(1) integers  
(2) whole numbers  
(3) irrational numbers  
(4) rational numbers
7 The inequality $7 - \frac{2}{3}x < x - 8$ is equivalent to
   (1) $x > 9$                  (3) $x < 9$
   (2) $x > -\frac{3}{5}$       (4) $x < -\frac{3}{5}$

8 The value in dollars, $v(x)$, of a certain car after $x$ years is represented by the equation $v(x) = 25,000(0.86)^x$. To the nearest dollar, how much more is the car worth after 2 years than after 3 years?
   (1) 2589                  (3) 15,901
   (2) 6510                  (4) 18,490

9 Which function has the same $y$-intercept as the graph below?

(1) $y = \frac{12 - 6x}{4}$  (3) $6y + x = 18$
(2) $27 + 3y = 6x$          (4) $y + 3 = 6x$
10 Fred is given a rectangular piece of paper. If the length of Fred’s piece of paper is represented by $2x - 6$ and the width is represented by $3x - 5$, then the paper has a total area represented by:

- (1) $5x - 11$
- (2) $6x^2 - 28x + 30$
- (3) $10x - 22$
- (4) $6x^2 - 6x - 11$

Use this space for computations.

11 The graph of a linear equation contains the points $(3,11)$ and $(-2,1)$. Which point also lies on the graph?

- (1) $(2,1)$
- (2) $(2,4)$
- (3) $(2,6)$
- (4) $(2,9)$

12 How does the graph of $f(x) = 3(x - 2)^2 + 1$ compare to the graph of $g(x) = x^2$?

- (1) The graph of $f(x)$ is wider than the graph of $g(x)$, and its vertex is moved to the left 2 units and up 1 unit.
- (2) The graph of $f(x)$ is narrower than the graph of $g(x)$, and its vertex is moved to the right 2 units and up 1 unit.
- (3) The graph of $f(x)$ is narrower than the graph of $g(x)$, and its vertex is moved to the left 2 units and up 1 unit.
- (4) The graph of $f(x)$ is wider than the graph of $g(x)$, and its vertex is moved to the right 2 units and up 1 unit.

13 Connor wants to attend the town carnival. The price of admission to the carnival is $4.50, and each ride costs an additional 79 cents. If he can spend at most $16.00 at the carnival, which inequality can be used to solve for r, the number of rides Connor can go on, and what is the maximum number of rides he can go on?

- (1) $0.79 + 4.50r \leq 16.00$; 3 rides
- (2) $0.79 + 4.50r \leq 16.00$; 4 rides
- (3) $4.50 + 0.79r \leq 16.00$; 14 rides
- (4) $4.50 + 0.79r \leq 16.00$; 15 rides
Corinne is planning a beach vacation in July and is analyzing the daily high temperatures for her potential destination. She would like to choose a destination with a high median temperature and a small interquartile range. She constructed box plots shown in the diagram below.

Ocean Beach

Whispering Palms

Serene Shores

Pelican Beach

Which destination has a median temperature above 80 degrees and the smallest interquartile range?

1. Ocean Beach
2. Whispering Palms
3. Serene Shores
4. Pelican Beach

Some banks charge a fee on savings accounts that are left inactive for an extended period of time. The equation \( y = 5000(0.98)^x \) represents the value, \( y \), of one account that was left inactive for a period of \( x \) years.

What is the \( y \)-intercept of this equation and what does it represent?

1. 0.98, the percent of money in the account initially
2. 0.98, the percent of money in the account after \( x \) years
3. 5000, the amount of money in the account initially
4. 5000, the amount of money in the account after \( x \) years
16 The equation for the volume of a cylinder is $V = \pi r^2 h$. The positive value of $r$, in terms of $h$ and $V$, is

1. $r = \sqrt{\frac{V}{\pi h}}$
2. $r = \sqrt[3]{Vh}$
3. $r = 2\sqrt{\pi h}$
4. $r = \frac{V}{2\pi}$

Use this space for computations.

17 Which equation has the same solutions as $x^2 + 6x - 7 = 0$?

1. $(x + 3)^2 = 2$
2. $(x - 3)^2 = 2$
3. $(x - 3)^2 = 16$
4. $(x + 3)^2 = 16$

18 Two functions, $y = |x - 3|$ and $3x + 3y = 27$, are graphed on the same set of axes. Which statement is true about the solution to the system of equations?

1. $(3,0)$ is the solution to the system because it satisfies the equation $y = |x - 3|$.
2. $(9,0)$ is the solution to the system because it satisfies the equation $3x + 3y = 27$.
3. $(6,3)$ is the solution to the system because it satisfies both equations.
4. $(3,0)$, $(9,0)$, and $(6,3)$ are the solutions to the system of equations because they all satisfy at least one of the equations.
19 Miriam and Jessica are growing bacteria in a laboratory. Miriam uses the growth function \( f(t) = n^t \) while Jessica uses the function \( g(t) = n^t \), where \( n \) represents the initial number of bacteria and \( t \) is the time, in hours. If Miriam starts with 16 bacteria, how many bacteria should Jessica start with to achieve the same growth over time?

(1) 32  (2) 16  (3) 8  (4) 4

20 If a sequence is defined recursively by \( f(0) = 2 \) and 
\( f(n + 1) = -2f(n) + 3 \) for \( n \geq 0 \), then \( f(2) \) is equal to

(1) 1  (2) -11  (3) 5  (4) 17

21 An astronaut drops a rock off the edge of a cliff on the Moon. The distance, \( d(t) \), in meters, the rock travels after \( t \) seconds can be modeled by the function \( d(t) = 0.8t^2 \). What is the average speed, in meters per second, of the rock between 5 and 10 seconds after it was dropped?

(1) 12  (2) 20  (3) 60  (4) 80

22 When factored completely, the expression \( p^4 - 81 \) is equivalent to

(1) \( (p^2 + 9)(p^2 - 9) \)
(2) \( (p^2 - 9)(p^2 + 9) \)
(3) \( (p^2 + 9)(p + 3)(p - 3) \)
(4) \( (p + 3)(p - 3)(p + 3)(p - 3) \)
23 In 2013, the United States Postal Service charged $0.46 to mail a letter weighing up to 1 oz. and $0.20 per ounce for each additional ounce. Which function would determine the cost, in dollars, $c(z)$, of mailing a letter weighing $z$ ounces where $z$ is an integer greater than 1?

(1) $c(z) = 0.46z + 0.20$
(2) $c(z) = 0.20z + 0.46$
(3) $c(z) = 0.46(z - 1) + 0.20$
(4) $c(z) = 0.20(z - 1) + 0.46$

24 A polynomial function contains the factors $x$, $x - 2$, and $x + 5$. Which graph(s) below could represent the graph of this function?

![Graphs](image)

(1) I, only
(2) II, only
(3) I and III
(4) I, II, and III
Aim:  YWBAT identify types of data (quantitative, qualitative/categorical, biased, unbiased, univariate, bivariate, symmetrical, skewed).  YWBAT create a dot plot to represent a data set.

Statistics is the mathematics of collecting, organizing, summarizing and analyzing data.

Data can be collected by recording all of the individual items in a data set. Data is displayed in tables and graphs.

Types of Data:

Quantitative Data—numerical data (Grades on a test, hours watching TV, heights of students)
Categorical Data (Qualitative Data) - non-numerical, data is identified by type.
(eye color, kind of pet owned, favorite TV show)

Univariate - Information is collected on one “variable” per observation.
 Example: Quantitative—Ages of students in a club.
       Categorical—Kind of car owned.

Bivariate - Information is made on two “variables” per observation.
 Example: Quantitative—Grade level and age of students in a school
       Categorical—Gender and favorite TV show.

Sometimes data is collected by taking a survey of a representative sample of a population. The results of the survey are used to make predictions. The sample should be large enough to represent the group and it should be fair and randomly collected.

Classify the following data as Quantitative or Qualitative/Categorical

Think:  Are the data numerical measurements? If so they are QUANTITATIVE.

1) Favorite Movies
2) Number of students taking Spanish
3) Football Jersey Numbers
4) Cost of music downloads
5) Eye color

Classify each of the following as UNIVARIATE or BIVARIATE.

Think:  Does the data set involve one or two variables? One—UNIVariate, TWO—Bivariate

6) The atomic weights of the elements in the periodic table
7) The edge length and the volume of cubes
8) Heights and weights of mammals
9) The cost of Internet service from several different providers
Aim: YWBT identify types of data (quantitative, qualitative/categorical, biased, unbiased, univariate, bivariate, symmetrical, skewed). YWBT create a dot plot to represent a data set.

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1) Favorite Movies
   __ Qualitative

2) Number of students taking Spanish
   __ Quantitative

3) Football Jersey Numbers
   __ Quantitative

4) Cost of music downloads
   __ Quantitative

5) Eye color
   __ Qualitative

Classify each of the following as UNIVARIATE or BIVARIATE.

Think: Does the data set involve one or two variables? One—UNIvariate, TWO—Bivariate

6) The atomic weights of the elements in the periodic table
   __ Univariate

7) The edge length and the volume of cubes
   __ Bivariate

8) Heights and weights of mammals
   __ Bivariate

9) The cost of Internet service from several different providers
   __ Univariate
Biased—A data set that is obtained that is likely to be influence by something.
Example:
Quantitative—To determine the average age of high school students by asking only tenth graders how old they are.
Categorical—Standing outside Yankee Stadium and asking people coming out of the stadium to name their favorite baseball team.

Unbiased—A data set that is obtained which has no connection to anything that would influence the results.
Example:
Quantitative—Asking people coming out of a stadium how many pets they have.
Categorical—Asking people leaving a large grocery store what their favorite color is.

10) You want to determine what percent of teens ages 14 to 18 watch wrestling on TV. At a high school wrestling match, you ask every third teenager whether he or she watches wrestling on TV. How might this cause bias in the results of your survey?

Someone who is at a wrestling match most likely watches wrestling on TV.

11) You want to know how many of your classmates have cell phones. To determine this, you send an email asking, “Do you own a cell phone?” How might this method of gather data affect the results of your survey?

Not everyone has an email
Some ppl don’t check their email

Organizing Quantitative Data
Single (ungrouped)—Small samples or collections of data that can be treated as individual items.
Statistical information such as mean, median, mode and range can be obtained by listing the data values individually.

Example: Quantitative—Test Scores of 42, 55, 65, 70, 72, 75, 80

A dot plot is an example of way to illustrate this data. A dot plot is made by plotting each data value on a scale or number line.

Student Grades

Categorical—In a classroom of students what pet(s) each student has
Grouped—When large numbers of values are included the data are often treated as groups called intervals. The range of the data is divided into equal intervals and each item of data this recorded in the appropriate interval. The statistical information is located in the intervals.

Example: Quantitative—There are 110 trees in an orange grove. The trees range in height between 100 cm to 340 cm. You decide to present the data by grouping it into 50 cm intervals (100-to just below 150, 150 to just below 200, etc.)

Heights of Orange Trees

<table>
<thead>
<tr>
<th>Height (cm)</th>
<th>Number of Trees</th>
</tr>
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<tbody>
<tr>
<td>100-150</td>
<td>2</td>
</tr>
<tr>
<td>150-200</td>
<td>30</td>
</tr>
<tr>
<td>200-250</td>
<td>28</td>
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<td>250-300</td>
<td>50</td>
</tr>
<tr>
<td>300-350</td>
<td>10</td>
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Categorical—Within certain age groups in a city, the highest level of Education achieved – high school, trade school, 2 year college, 4 year College, graduate school.

In any visual representation it is important to look at the way the data is distributed. The shape of the distribution tells you information about the data.

Analyzing Data:

Center of the Data—A value that divides the data so that about half of the data points are smaller than the center and about half are larger. Two common measures of center are the MEAN and MEDIAN.

MEAN—Sum total of the data values divided by the number of items in the data.

MEDIAN—The middle data value when the data are listed in order. (Ascending or Descending)

Symmetrical: If the graph of the data were folded vertically at the center and the two sides match the distribution is symmetrical. The amount of data on one side of the central line closely matches the data on the other side. In a symmetrical distribution the MEAN and MEDIAN are close together or may even be the same value.

Skewed: If the data has an item or items that are located significantly distant from the main grouping of the data. On a dot plot, skewed data has a "tail". The tail represents outliers that are either high or low values. If the tail goes to the right (high) the data are skewed right. If the tail goes to the left the data is skewed left (low).
For each of the following data sets:

4) Make a dot plot on the number line.
B) Determine if the data is symmetrical or skewed.
C) Find the MEAN and MEDIAN for the data set.

Data Set #1—Pre-Assessment Grades for an Algebra class of 15 students.
35, 30, 20, 30, 30, 30, 30, 30, 25, 40, 40, 70

Data Set #2—Midterm test for an Algebra class of 15 students.
67, 70, 72, 72, 75, 75, 75, 75, 78, 78, 80, 83

Data Set #3—Final exam for an Algebra class of 15 students.
65, 70, 78, 80, 83, 85, 85, 85, 85, 87, 87, 87, 90, 90
For each of the following data sets:
A) Make a dot plot on the number line.
B) Determine if the data is symmetrical or skewed.
C) Find the MEAN and MEDIAN for the data set.

**Data Set #1**—Pre-Assessment Grades for an Algebra class of 15 students.
20, 25, 26, 26, 30, 30, 30, 30, 32, 32, 32, 35, 40, 67, 70

![Dot plot for Data Set #1](image)

**Data Set #2**—Midterm test for an Algebra class of 15 students.
67, 70, 72, 72, 75, 75, 75, 75, 78, 78, 80, 83

![Dot plot for Data Set #2](image)

**Data Set #3**—Final exam for an Algebra class of 15 students.
65, 70, 78, 80, 83, 85, 85, 85, 85, 87, 87, 87, 90, 90

![Dot plot for Data Set #3](image)