Practice QR Assessment 1

1) Consider the following data, from the Pew Research Center.

From the following statements, select all that you know to be true based on the data given in this chart:

- a. Almost twice as many LGB people as straight people have used a dating site or app.
- b. Women are less likely to use a dating site or app than men are.
- c. People with some college are 7% more likely to use a dating site or app than people with HS or less education.
- d. 18% of U.S. adults have used a dating site/app but have never been married or in a committed relationship with someone they met that way.
- e. More people ages 18-29 than people 30 and over have used a dating site or app.
2) A farmer leaves her mule tied to a shed with plenty of fresh water and food on her grassy farm. When she returns, though, the mule has eaten all of the grass he could reach and is sick. The vet needs to know how much grass the mule ate. The shed is 18 ft long and 18 ft wide, and the tether connecting the mule to the shed is 18 ft long. What is the square footage of reachable grass that the mule consumed? Round to the nearest square foot.
3) You have a savings account. When you open it you place $1,200 into it, and you
don't make any subsequent deposits. The amount of money you have in the savings
account grows by the same percent each year (thanks to interest). At the end of the first
year you have $1,224 in the account. How much money will there be in the account 20
years after opening it? Round to the nearest dollar

   a. $1,680
   b. $1,704
   c. $1,742
   d. $1,783
   e. $1,819
4) A commercial artist needs to rent some high quality photographic equipment to reproduce her artwork. She considers two different types of equipment. The cost of renting and using the first type is $304.60 plus $2.35 per copy. The cost of renting and using the second type is $216.20 plus $4.05 per copy. How many copies would the artist need to make for her to be indifferent between the two types of equipment?
5) When studying sedimentary deposits, geologists are often interested in the distribution of grain size – that is, the proportions of different sizes of grains there are in a given deposit. To measure grain size, geologists use what is known as the $\phi$ grade scale ($\phi$ is a Greek letter pronounced either fee or fie). Numbers on this scale range from -12 for very coarse, rocky material (like boulders) to +14 for very fine material (like clay). A zero (0) on the scale represents coarse sand. This figure shows grain-size distributions for four different samples of sediment, numbered (i) through (iv).

Grain-size distributions for four different samples. The horizontal axis shows grain size using the $\phi$ grade scale. The columns represent the proportion of each sample consisting of a given grain size.

Consider the following two descriptions of samples, each of which matches one of the images above:

Sample S is taken from a gravel driveway. Sample R is taken from a laboratory sieve. All of the coarsest and finest grains have been filtered out, leaving a very uniform mix.

Which distributions in the image are the best match for S and R?

a. S = i, R = iii
b. S = iii, R = i
c. S = i, R = ii
d. S = iv, R = iii
e. S = iv, R = ii
6) Every day you sit down and download a digital copy of the New York Times to read. You do this at your favorite Starbucks, which has a download speed of 25 megabits per second and it generally takes exactly 3 seconds to do this. One day you cannot make it to Starbucks to download the newspaper, so you download it at a public library instead. Its wifi download speed is 15 megabits per second. How many seconds quicker do you download the New York Times at Starbucks than at the library? Assume that each New York Times virtual issue is the same number of megabits every day.

a. 2 seconds  
b. 1.8 seconds  
c. 1.6 seconds  
d. 1.4 seconds  
e. 1.2 seconds
7) The national debt is the amount of money owed by the U.S. government. As of January 2020, the U.S. national debt amounted to $23.2 trillion. As of January 2020, the size of the U.S. population was 330 million. Suppose every person in the U.S. contributed $7,000 towards paying off the national debt. What would the remaining balance be, in trillions of dollars? Give your answer to the nearest trillion.

Note: In the U.S., 1 billion equals 1,000 million and 1 trillion equals 1,000 billion
8) The table below shows the populations (in millions) of three different countries labeled A, B, and C. One of them is growing at an overall steady rate over the 60 years shown by the table. One is growing faster and faster. One is growing slower and slower. Indicate which is which by choosing the correct option below.

<table>
<thead>
<tr>
<th>year</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
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<tbody>
<tr>
<td>0</td>
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<td>29.3</td>
<td>24.4</td>
<td>20.5</td>
</tr>
<tr>
<td>50</td>
<td>32.3</td>
<td>26.3</td>
<td>25.2</td>
</tr>
<tr>
<td>60</td>
<td>34.8</td>
<td>28.1</td>
<td>30.9</td>
</tr>
</tbody>
</table>

a. A is growing at a steady rate; B is growing faster and faster; C is growing slower and slower.
b. A is growing at a steady rate; C is growing faster and faster; B is growing slower and slower.
c. B is growing at a steady rate; A is growing faster and faster; C is growing slower and slower.
d. B is growing at a steady rate; C is growing faster and faster; A is growing slower and slower.
e. C is growing at a steady rate; A is growing faster and faster; B is growing slower and slower.
f. C is growing at a steady rate; B is growing faster and faster; A is growing slower and slower.
9) A saleswoman is partially paid based on the cost of the items she sells. In one week, she will be paid:

- $10 per hour that she works
- $0.03 per dollar worth of items that she sells, up to the first $2,000
- $0.07 per dollar worth of items that she sells after the first $2,000

How much will she be paid if she works 30 hours and sells $8,000 worth of items?
10) Based on the charts shown below, how much money (in dollars) was spent on Aid to Families with Dependent Children (labeled AFDC on the chart)? Round your answer to the nearest whole dollar.
11) An analyst is reviewing the amount of money political candidates received in donations. They found that 62% of candidates, running in uncontested races, received an average of $1.2 million each. The 29% of candidates running in contested elections received an average of $4 million each. The remaining 9% of candidates running in highly contested elections received significantly higher donations. The average across all three groups was $5 million. What was the average donation received by the candidates in the highly contested elections?
12) A high school has 7 large trash cans, each a cylinder 2 feet across and 3 feet high, which get filled with trash every day. The custodian empties the trash cans into a dumpster that holds 10 cubic yards. How many days worth of trash can the dumpster hold without overflowing? There are 3 feet to a yard.
13) The population of the United States was 250 million people in 1990, and 331 million people in 2020. Assume that the population of the state of Texas increased by the same proportion of its population as the United States -- in other words, it had the same percentage growth rate. In 2020, the population of Texas was 29 million people. What was the population of Texas in 1990, in millions of people? Give your answer to the nearest whole number.
14) A car’s fuel efficiency is 37 mpg, measured in miles driven per gallon of gas. You are planning to drive for 4 hours at a speed of 65 miles per hour. How much fuel will you need? Give your answer to the nearest whole number of gallons.
15) Four different animal populations are increasing in size as time goes by. Each population grows at a constant annual rate. Let $P_1$, $P_2$, $P_3$, and $P_4$ stand for the sizes of the four populations in year $t$. The formulas for these four populations are

- $P_1 = L + rt$
- $P_2 = 3L + 2rt$
- $P_3 = L/2 + (r + 250) t$
- $P_4 = L + 250 + rt$

where $L$ and $r$ are positive constants.

Which of the following descriptions are true? Select all that are true.

a. $P_2$ begins (in year $t = 0$) at the same level as $P_1$.
b. $P_3$ begins (in year $t = 0$) at the same level as $P_1$.
c. $P_2$ grows at the same annual rate as $P_1$.
d. $P_4$ grows at the same annual rate as $P_1$.
e. $P_3$ grows by 250 more animals per year than $P_1$.
f. $P_4$ grows by 250 more animals per year than $P_1$.
g. $P_2$ begins (in year $t = 0$) with more animals than $P_1$, and it grows at a faster rate.
h. $P_4$ begins (in year $t = 0$) with more animals than $P_1$, and it grows at a faster rate.