

Summer 2017 Review

For

Students Entering

Statistics



Holy Name High School

Complete the following problems using the calculator only to check your manual answers. Due Tuesday, August 22, 2017.

(NOTE: Use www.khanacademy.org www.mathisfun.com or www.purplemath.com to find specific math related topics with accompanying videos and demonstrations)

1. Here is a formula that is used often in Statistics:

$$z = \frac{x - \mu}{\sigma}$$

(Greek letters such as μ and σ are used in many statistics calculations)

- a. If $\mu = 24$, $x = 20$, and $\sigma = 3$,
what is z ? Show your work.
- b. If $z = -3.35$, $x = 60$, and $\sigma = 4$, what is μ ?
Show your work.
- c. If $z = 1.96$, $\mu = 18.4$ and $\sigma = 3.2$,
what is x ? Show your work.
- d. If $z = -2.05$, $x = 8.3$, $\mu = 10.4$, what is σ ?
Show your work.

Give the slope and y-intercept of each line for problems 2 and 3.

2. $y = -3x + 21$

3. $7x - 9y = 18$

4. Write the equation of the line with a slope of $-\frac{2}{3}$ that passes through the point (5,24).

5. Write the equation of the line with a slope of .0235 and a y-intercept of 3.52.

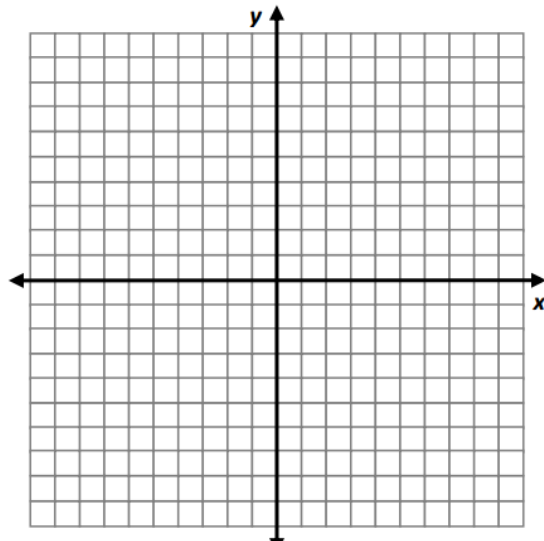
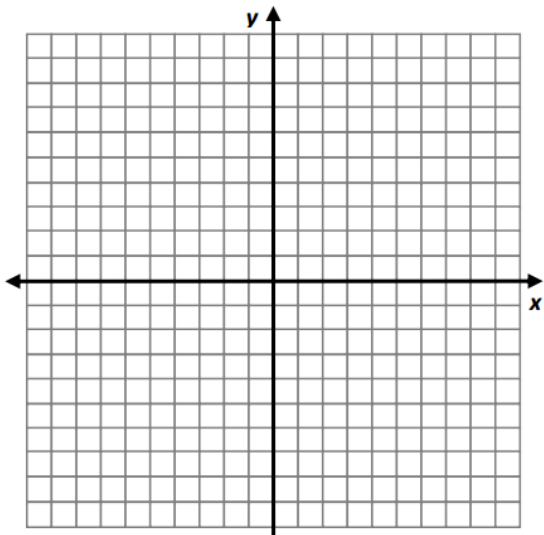
6. The following equation can be used to predict the average height of boys anywhere between birth and 15 years old: $y = 2.79x + 25.64$, where x is the age (in years) and y is the height (in inches).

a. What does the slope represent in this problem? Interpret it in context.

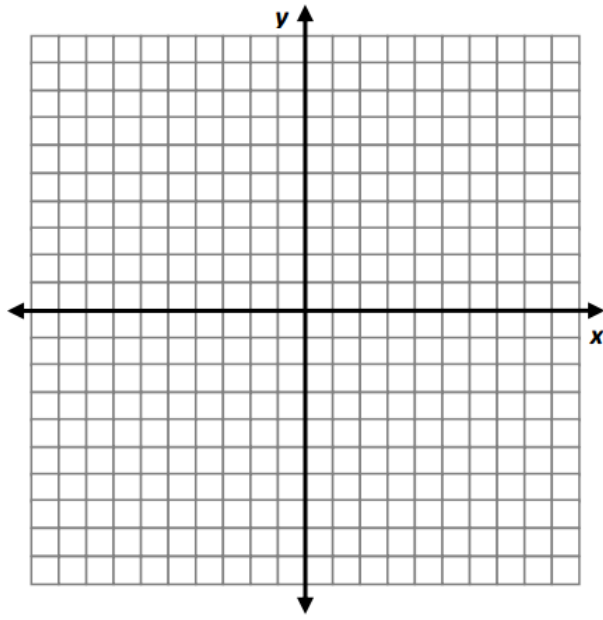
b. What does the y -intercept represent in this problem? Interpret it in context.

7. Graph $y = \frac{1}{3}x + 5$

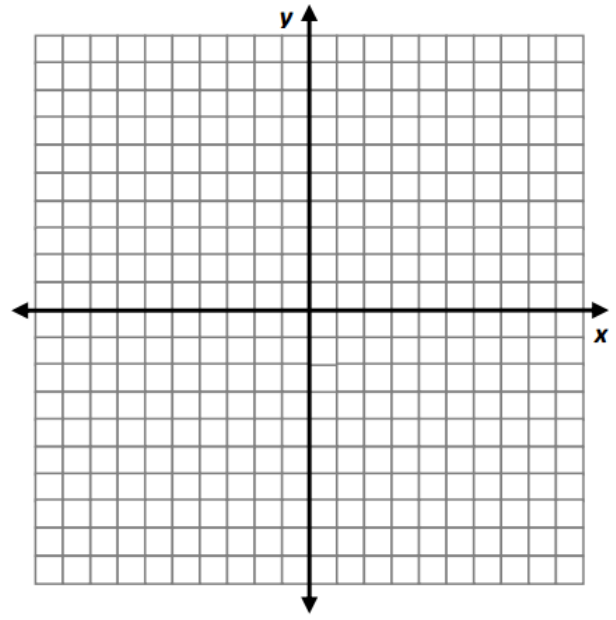
8. Graph $y = 7 + 3x$



9. Graph the line $y = 5 + \frac{3}{4}x$



10. Graph the line $y = 3 - \frac{x}{5}$



MEASURES OF CENTER: mean, median, and mode are called measures of center or central tendency. They tell us what the center or typical value of a data set is.

Mean = arithmetic average. Find the mean by adding up all the numbers data values and dividing by how many data values there are.

Median = the middle value. Find the median by listing the data set in order from smallest to largest and locating the middle value. If the data set has an odd number of data points, there will be one exact number in the middle. If the data set has an even number of data points, you need to take the average of the two middle values.

Mode = the number that shows up most often. A data set may have no mode (none of the values are repeated), one mode, two modes, or several modes.

MEASURES OF SPREAD:

Range = maximum — minimum. The range is the difference between the largest number in the data set (maximum) and the smallest number (minimum).

Interquartile Range (IQR) = $Q3 - Q1$. The IQR is the range of the middle 50% of your data.

The five number summary for the data set include the minimum data value(min), maximum data value(max), Q_1 , Median(Q_2), and Q_3 .

Look at the data set below. It shows the number of shots made from 50 free throws for 18 players.

12 32 42 50 39 38 27 34 42 35 48 36 13 15 23 16 25 43

What's the first thing we need to do? Sort it from lowest to highest! We've found the median – its between the 9th and 10th value. Below, we've marked the median with a line to divide the data set into the lower half and the upper half. How many data values are in each half? The same number!

Median
= 34.5

12 13 15 16 23 25 27 32 34 | 35 36 38 39 42 42 43 48 50
Lower Data Set Upper Data Set

Find the median of the lower data set → 23. This is called the lower quartile, or Q_1 .

Find the median of the upper data set → 42. This is called the upper quartile, or Q_3 .

Now, we have everything (the five number summary) we need to make a box and whisker plot. Always use a scale to draw the box and whisker plot.

Number of shots made from 50 attempts

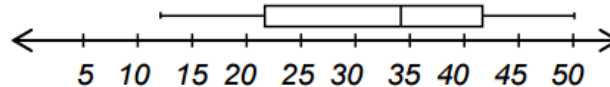
Min = 12

Q_1 = 23

Median = 34.5

Q_3 = 42

Max = 50



1. A real estate agent has sold seven homes priced at \$104,900, \$119,900, \$134,900, \$142,000, \$179,900, \$199,900, \$750,000.

- a) Find the mean selling price.
- b) Find the median selling price.
- c) Find the mode of the selling prices.
- d) How does the selling price of \$750,000 affect the mean selling price?
- e) How does this explain why the most commonly used measure of central tendency for housing prices is the median rather than the mean or the mode?

2. A survey was conducted by Mrs. Johnson in her math class. She asked, "How many hours did you spend on homework this past week?" The responses are below:

13	4	10	8	9
0	2	5	15	12
9	16	11	8	4
3	8	10	6	8
11	6	7	11	9

Find the lowest value, highest value, Q_1 , median, and Q_3 . Draw a box and whisker plot for this set of data.

3. Twenty high school students took the Math 2 examination and received the following scores:
70, 60, 75, 68, 85, 86, 78, 72, 82, 88, 88, 73, 74, 79, 86, 82, 90, 92, 93, 73. Create a **histogram for this data**.
Use the frequency table below. Helpful video <https://www.youtube.com/watch?v=fbckNjLK7mw>

Grade Range	Frequency
60-64	
65-69	
70-74	
75-79	
80-84	
85-89	
90-94	

Statistics is the science of collecting , organizing, analyzing, summarizing, and drawing conclusions from data.

A **variable** is a characteristic or attribute that can assume different values.

Data are the values that variables can assume.

Quantitative variables are the numerical values that can be ordered. Age, weight, body temperature are examples of quantitative variables.

Categorical or Qualitative variables are variables that can be placed in distinct categories. Gender, favorite ice cream flavor, county you live in, are examples of categorical variables.

Use the definitions above as well as the apstatsguy summer video number two :

https://www.youtube.com/watch?feature=player_detailpage&v=j_Y_0eh-FCQ

To help you determine answers to the following:

Determine if the variables listed below are quantitative or categorical.

1. Favorite author
2. Number of people living in a household
3. Eye color
4. Temperature of a cup of coffee
5. Yearly salary
6. Gender
7. Time it takes to get to school
8. Height
9. Amount of water you drink per day
10. Jellybean flavors
11. Zip code
12. pizza toppings
13. number of shoes owned