Algebra 1 Honors Summer Assignment

Welcome to Algebra 1 Honors! Algebra is the mathematics of abstract systems, or algebraic structures, and the manipulation of expressions within those systems. We investigate mathematical statements using *variables* for unspecified values, and seek to determine for which values the statements are true.

This assignment covers material relevant to the first quarter of the year that you have been exposed to in previous math courses, so that you may review it and feel prepared to begin Algebra 1 with a strong footing. As you work through each section, make note of difficult problems you encounter. In each section, problems are grouped by concept.

Additionally, you can consult the sites under "Helpful Links" **on the last page of this assignment** to aid in your review. If you have any further questions as you work through the assignment, please feel free to email me. I will check my email periodically throughout the summer and respond to any questions you have when I am able.

To receive credit, you must show your work for each problem. Please complete all **graph** problems on graph paper.

Bring this assignment with you on the **2nd** day of class. I look forward to seeing you in August!

Best,

Mr. Cantlin
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0.1 Linear Equations and Inequalities

1. Solve each equation. Show your work.

   (a) $-5(7-2y)+3(4y+1)=12$

   (b) $6.1(14-3h)=-7.9h+59.4$

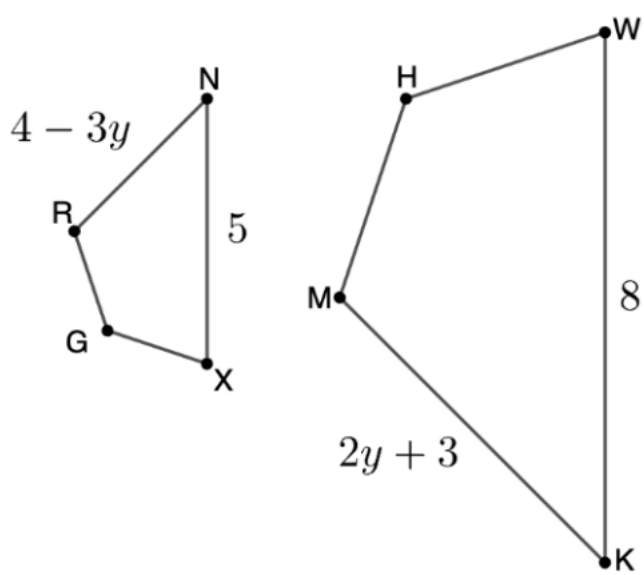
   (c) $\frac{7}{2}(-2+8k)=\frac{3}{5}(2k+22)$

2. Solve each inequality. Show your work, and then **graph** each solution on a number line.

   (a) $3.8x-24.46 \leq 2.3(4-5x)$

   (b) $-\frac{3}{4}(19+7x)-\frac{13}{4} < \frac{7}{4}(2x+5)$

3. Two figures are shown, where $GNRX$ is similar to $HMKW$, $RN = 4-3y$, $NK = 5$, $MK = 2y+3$, and $WK = 8$.



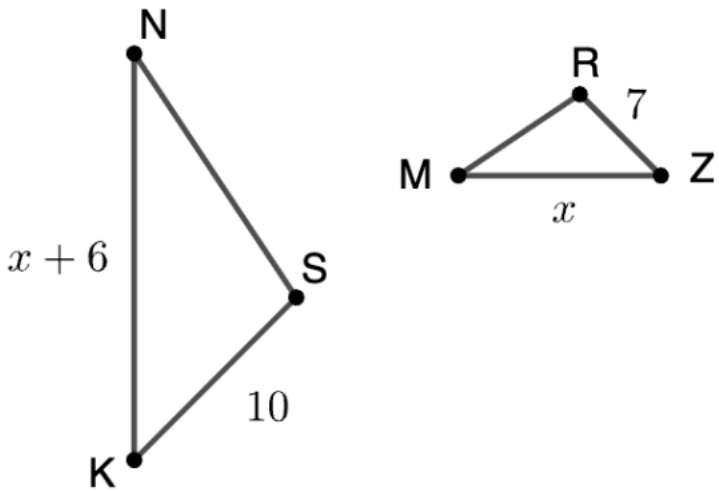
   (a) Write and solve an equation to find the value of y

   (b) Determine the length of each side.

      i. $RN =$

      ii. $MK =$

4. Similar triangles ΔNKS and ΔMZR are shown, where $\overline{KS}$ corresponds to $\overline{RZ}$ and $\overline{NK}$ corresponds to $\overline{MZ}$. Write and solve an equation to find the value of x.



5. Five equations are shown. Complete the table by determining the number of solutions each equation has.

Equation	One Solution	No Solutions	Infinitely Many Solutions
$12 + 4y = 4(y + 3)$	☐	☐	☐
$4(8w - 1) = 32w + 19$	☐	☐	☐
$\frac{2x-5}{6} = \frac{x}{3} - 1$	☐	☐	☐
$\frac{1}{3}(2x - 54) + 4\frac{1}{3}x = -7$	☐	☐	☐
$1.5(4r + 3) = 0.5 + 2(2 + 3r)$	☐	☐	☐

0.2 Two-Variable Statistics

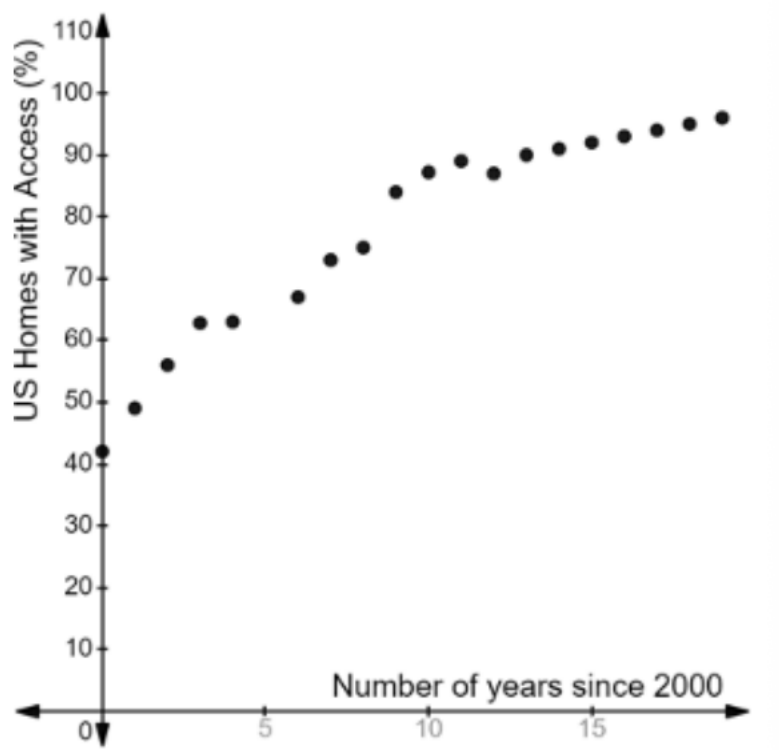
1. A researcher collected data on the distance, in inches (in.), a sloth climbed on a tree and the time, in seconds (sec.), the sloth took to reach that distance. Her data is shown

Time (sec.)	2	4	5	7	8	9	11	12	15
Distance (in.)	5	11	12	17	20	26	30	34	40

   (a) On **graph paper**, create a scatter plot for the data. Ensure that you **scale** and **label** your axes.

   (b) Describe the association between the data, based on the scatterplot you constructed in part (a).

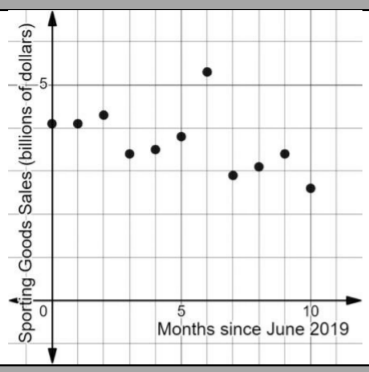
2. A scatterplot of the percentage of US households with access to cell phones since the year 2000 is shown.



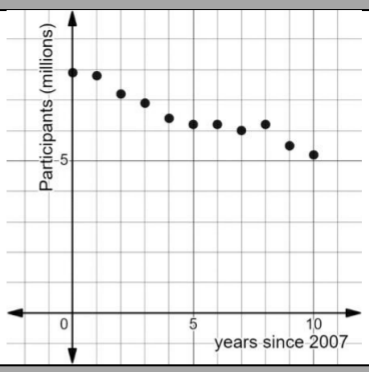
   Describe the correlation of the data points. Then, complete the following sentence: "As the number of years since 2000 increase, the percentage of US homes with access to cell phones _____."

3. Six scatter plots are shown. Match each scatter plot with characteristics that are true about the data shown on the graph.

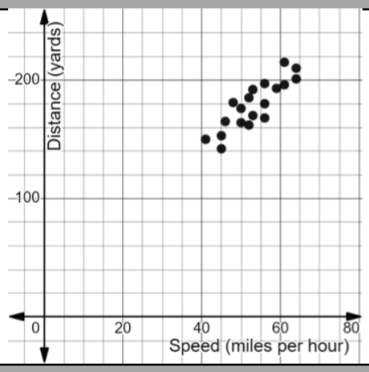
Scatter Plot A



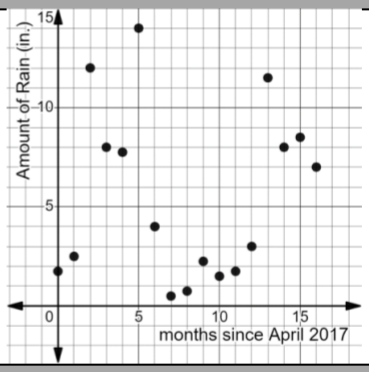
Scatter Plot B



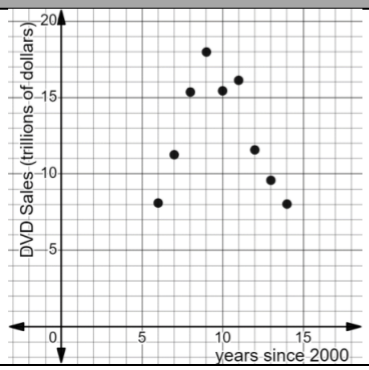
Scatter Plot C



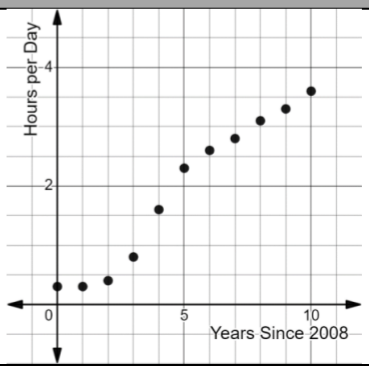
Scatter Plot D



Scatter Plot E



Scatter Plot F

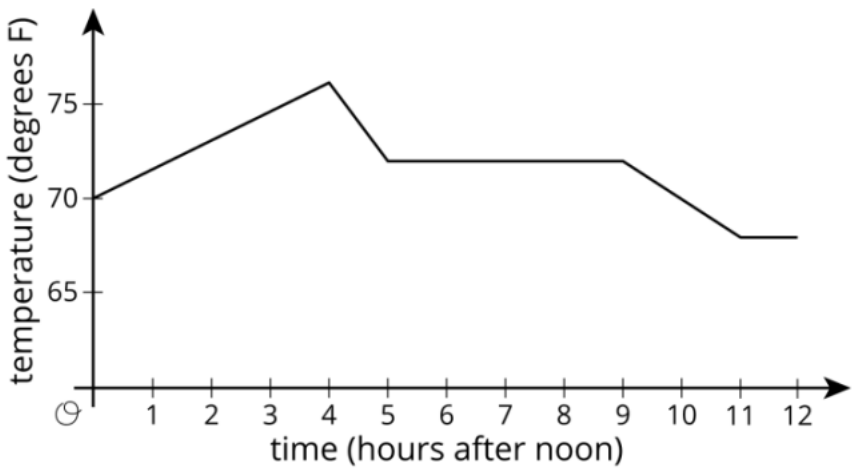


	Scatter Plot					
Characteristics	**A**	**B**	**C**	**D**	**E**	**F**
Strong Association	☐	☐	☐	☐	☐	☐
Weak Association	☐	☐	☐	☐	☐	☐
No Association	☐	☐	☐	☐	☐	☐
Positive Association	☐	☐	☐	☐	☐	☐
Negative Association	☐	☐	☐	☐	☐	☐
Outlier(s)	☐	☐	☐	☐	☐	☐

4. Purchase (or research manufacturer data for) a candy that you enjoy, that comes in multiple colors in the same bag (e.g., m&m's.). Identify the candy you are using, and construct a table recording the frequency (or count) of each color that appears in the bag. Identify the *most* and *least* common color for your bag.

0.3 Functions

1. Kris recorded the temperature, in degrees Fahrenheit (°F), in his house between noon (12:00pm) and midnight (12:00am). The graph of his observations is shown.



Identify the true statements from the list below.

I Time is a function of temperature.

II Temperature is a function of time.

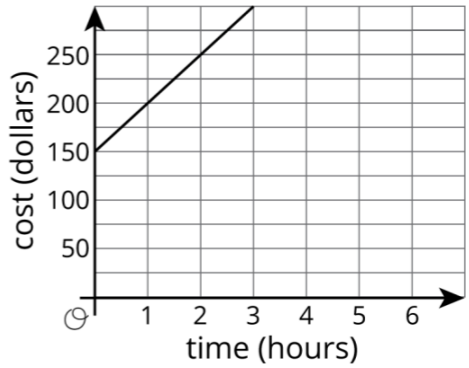
III The lowes ttemperature occured between 4:00pm and 5:00pm.

IV There was a 4-hour period during which temperature did not change.

V The temperature consistently decreased between 4:00pm and midnight.

VI The temperature consistently increased between 12:00pm and 4:00pm.

2. Two plumbing companies have different rates they charge for their services. Each company charges a one-time fee and additional charge per hour worked during a service call. Each company's fee model is shown.

Company A	Company B
	

Hours Worked	Cost (dollars)
1	125
4	350
6	500

(a) Identify the slope and y-intercept for each company's fee model. **Clearly identify which company is which in your answer**

(b) Write an equation in slope-intercept from to represent the cost, y, each company charges for x hours (hr.) worked.

Company A: _____

Company B: _____

(c) Identify which company should be hired for each scenario. Then, justify your selection.

Scenario	Company	Justification
The service call took 2 hr. to complete.	○ A ○ B	
The company couldn't fix the problem, so they only charged the one-time fee.	○ A ○ B	
The service call took 5 hr. to complete.	○ A ○ B	

3. The table shows the maximum descent angle and maximum speed of 6 roller coasters.

Roller Coaster Name	Maximum Descent Angle (degrees)	Maximum speed (miles per hour)
Kingda Ka	90	128
Millennium Force	93	80
Spiderman: Escape from Krypton	100	90
Fury 325	81	95
Orion	85	91
Top Thrill Dragster	120	90

(a) Construct a mapping diagram using the data from the table, that maps Maximum Descent Angle (degrees) to Maximum speed (miles per hour).

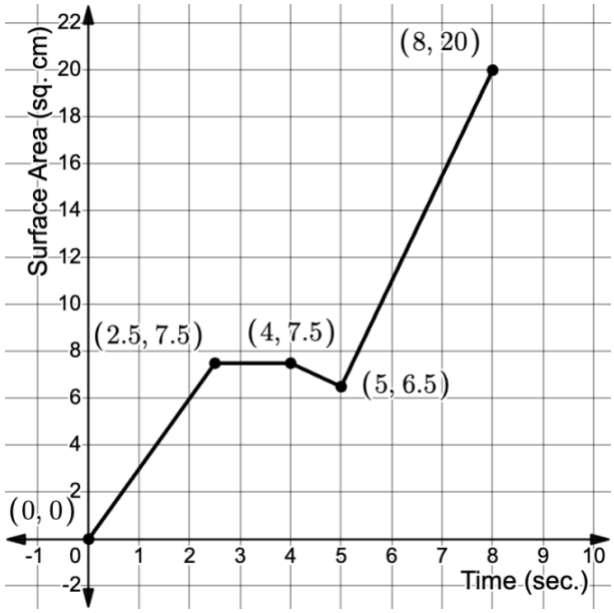
(b) Is the relationship between maximum descent angle and maximum speed of the roller coasters discrete or continuous? Explain your reasoning.

(c) Is the relationship between maximum descent angle and maximum speed of the roller coasters a function? Explain your reasoning.

4. Create a graph to represent the following relation. Then, determine which ordered pair must be removed to make the relation a function.

x	11	3	7	4	1	0	7
y	4	0	2	2	11	3	4

5. A clown was blowing up a balloon. The surface area of the balloon, in square centimeters (sq. cm), as a function of time, in seconds (sec.), is shown on the graph.



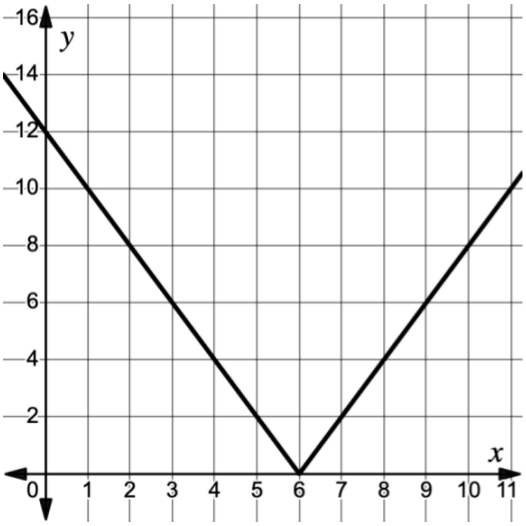
(a) Identify the increasing interval(s) using an inequality.

(b) Identify the decreasing interval(s) using an inequality.

(c) Identify the constant interval(s) using an inequality.

(d) Interpret the constant interval(s) in the context of this problem.

6. Three functions are shown.

Function A	Function B	Function C
	$y = -\frac{1}{2}x + 5$	Verna has $\$10$ in savings from her allowance. She saves an additional $\$1.25$ every week.

(a) Which functions have the same domain?

(b) Which function has the largest x-intercept?

(c) Which function has the smallest y-intercept?

(d) Which functions are increasing on the interval $x > 6$?

Helpful Links
https://www.khanacademy.org/math/algebra
https://www.khanacademy.org/math/geometry
https://www.stewartcalculus.com/_update/media/common/reviewofalgebra.pdf
https://www.stewartcalculus.com/_update/media/common/reviewofanalgeom.pdf
https://www.youtube.com/@patrickjmt/playlists
https://www.youtube.com/@TheOrganicChemistryTutor/playlists

Note, while these links cover the material of the review, this list is **not** exhaustive. If you are unable to find material on content you need help with, please reach out to me and I would be happy to send you additional resources.