Coordinate Algebra – 1ˢᵗ Semester Exam Study Guide

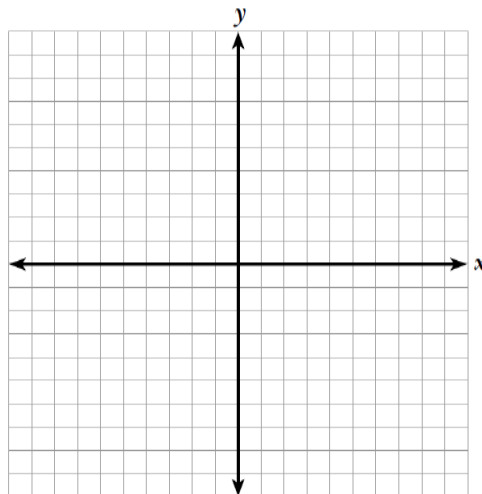1. Create a graph which contains the following:
   - Discrete data
   - Labels for the domain and range
   - At least four linear points
   - At least four non-linear points

   a. List the coordinates that make up your linear function.

   b. Write an equation to represent this linear data.

   c. List the coordinates that make up your non-linear function.

   d. How can you tell if your data is non-linear?

2. A rural town is growing in population at a rate of 2% per year. If the current population is 7,000 people, what will the population be in 5 years, 10 years, and 20 years?

3. Juan is saving for a new computer and has saved $213. He is saving $3 a day and needs $654 for the computer he wants.
   a. Create a graph showing how much money he has saved and how long it will take to save the $654.

   b. What is the domain and range of this situation?
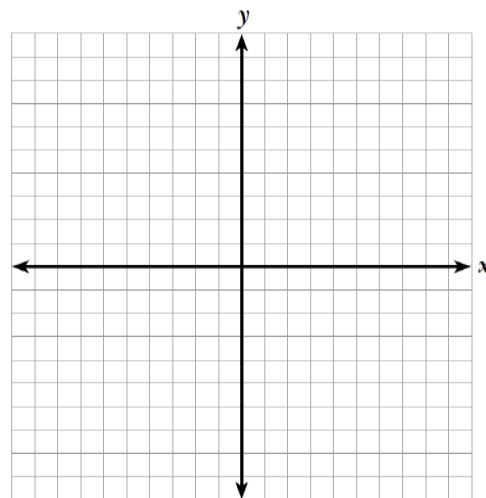
4. Mallory had $1 and her brother John had $0.25 cents this morning. Both kids asked their mom for more money. Instead of just giving them more money mom said she would give Mallory $2 the next day if she still had the dollar she was holding. Plus she would continue to give $2 each day as long as she saved it all. Mom told John she would double his money if he still had the money from the previous day. Again, she would continue giving him double each day as long as he saved it all. Who has more money? How do you know? Explain your reasoning.

5. *A(x)* is a function that shows the growth of an ant population each day. What, specifically does *A(12) = 512* mean?

6. Using the blank graph to the right, sketch the graph of a function showing a decreasing variable rate of change.
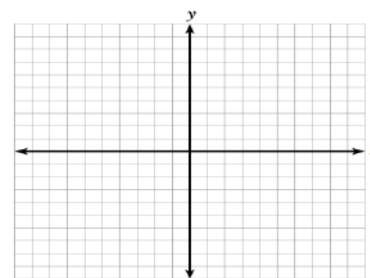
7. Dr. Smith gives private trumpet lessons. He works with middle grades students for thirty minutes and high school students for sixty minutes. He wants to spend no more than 12 hours per week doing individual lessons.
   a. Write an inequality to represent this situation. Let *m* represent middle school students and *h* represent high school students.

   b. Create a graph showing middle school students as your domain and high school students as your range. Indicate the region showing how many high school and middle school students Dr. Smith could be working with.
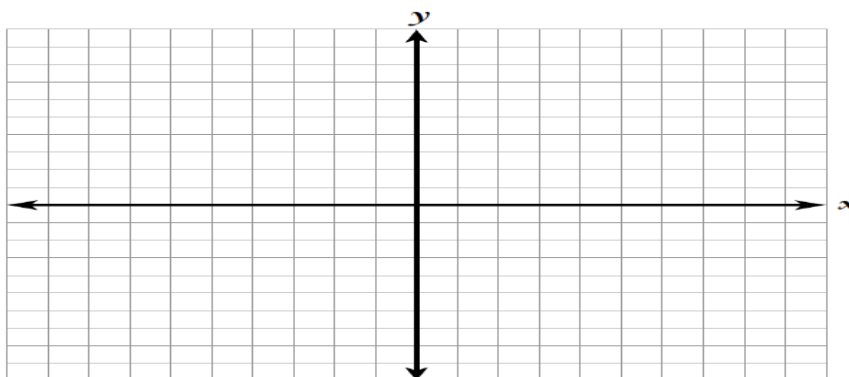
8. In order to qualify for the latest singing competition, contestants must be at least 15 years old, but less than 40 years old. Sketch a graph on a number line showing all possible ages.

9. A yearly pass at Stone Mountain Park costs, $65. Parking is $5 per day. Write an equation to represent the total cost, *C*, of visiting Stone Mountain Park for *d* days.

10. A company manufactures solid glass spheres. Each sphere has a radius of 4 inches and is packed in a gift box shaped like a cube. The box is small enough so that each side of the box touches the sphere. What is the volume, in cubic inches, of the box? Show your work.

11. When finding the area of a trapezoid you can use the formula $A = \frac{h(a+b)}{2}$, where h represents the height, a is the longer parallel side, and b is the shorter parallel side. Rearrange this formula to solve for the longer parallel side.

12. Bob pays $10 a month for Netflix and an additional $2 for each movie rented on demand from Vudu. Angelina pays $5 a month for Hulu and an additional $3 for each movie rented on demand from Blockbuster. Who has the better deal if more than 5 movies are rented on demand each month? Justify your answer.

13. How many solutions are shown in the graph?
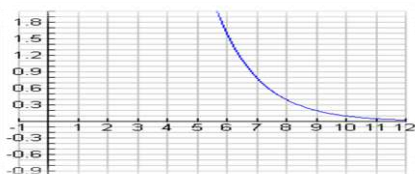
15. Describe two different ways to begin solving the problem: $10 + 4(x\text{-}5) = 15$

14. Find the function that could be used to generate the continued pattern of triangles shown below.
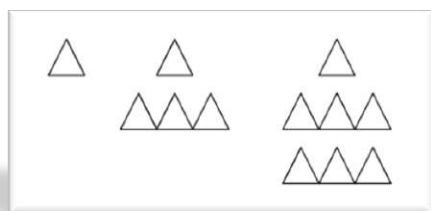
16. Solve the system of equations below, also known as a bivariate system, using the elimination method.

$3x + y = 13$ and $x + 6y = -7$

Use the table below to answer questions 17 - 20.

Cost to Visit Space Center	
n Children	1 Adult and n Children
0	$17
1	$30
2	$43

17. The table above shows the cost to visit the Kennedy Space Center, where *n* is the number of children and *f(n)* is the total cost of 1 Adult and n children. If you were to graph this data would it be discrete or continuous? Why?

18. What is $f(2)$?

19. What is $f(x) = 17$?

20. Using what you know from the table, what is $f(5)$?

21. Using the graph below, identify the range using inequality notation.
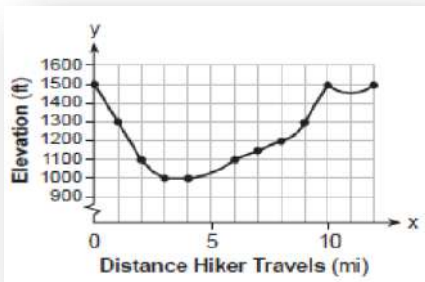
22. Given $y \geq 3x + 2$ **and** $y < x + 5$, which of the following points satisfies both?

    i.   (2,10)   iii. (-5, 0)

    ii.   (0,0)   iv. (0, 2)

23. Which values of a and b satisfy both equations:

    $5a - 2b = 3$ and $2a - b = 0$

    i.   a = 2, b=4   iii. a = 3, b = 6

    ii. a = 1, b = 1   iv. a = 0, b = 0

24. Using the diagram below fill in the missing boxes with the appropriate number.

25. What point is on the line $y = 2x + 1$ and the line $y = -\frac{1}{3}x + \frac{10}{3}$?