6 - 12 Tasks

Quarterly Meeting # 2

November 2013

The Reading Rate Task

At the beginning of 6th grade, friends Jennifer and Susan decided to read the books within the Series of Unfortunate Events. Jennifer read a total of 6 books over 8 months. Susan read a total of 8 books over 10 months.

a. Which girl is reading at a faster rate? Make a table or graph to justify your answer.

b. At this rate, how many books will Jennifer read after one year? How many books will Susan read? Explain how you arrived at your answers.

# Grade 7 Task

The Collecting Plant Species Task

Darien is working on a science project involving the diversity of plants found in a field near his home. To do his science project, he has measured a 12 foot by 15 foot plot of land and has divided this plot into 1 foot by 1 foot squares. He is listing the plants in each square and collecting samples of the plants for his project. After 2 ½ hours, Darien has collected samples from 2/9 of the field.

a. How many 1 foot by 1 foot squares has he completed in 2 ½ hours? Explain your reasoning.

b. If Darien worked at a constant rate, what fraction of the field would he have completed in 1 hour? Draw a picture to support your calculation.

c. If Darien continues to work at the same constant rate, how long will it take him to collect the samples from his entire plot of land? Explain how you know.

d. Darien's partner LiliAndra is doing a similar investigation in a field near her home. This field is long and narrow, so she has measured a 6 foot by 30 foot plot of land to use and has divided her plot into 1 foot by 1 foot squares. In 3 hours and 20 minutes, LiliAndra has collected samples from 60 of her 1 foot by 1 foot squares. At what rate is LiliAndra collecting samples? How long will it take her to complete her field?

e. Draw a graph to compare Darien's progress to LiliAndra's. Does the shape of the field make a difference in your graph? Why or why not?

Collecting Plant Species Task
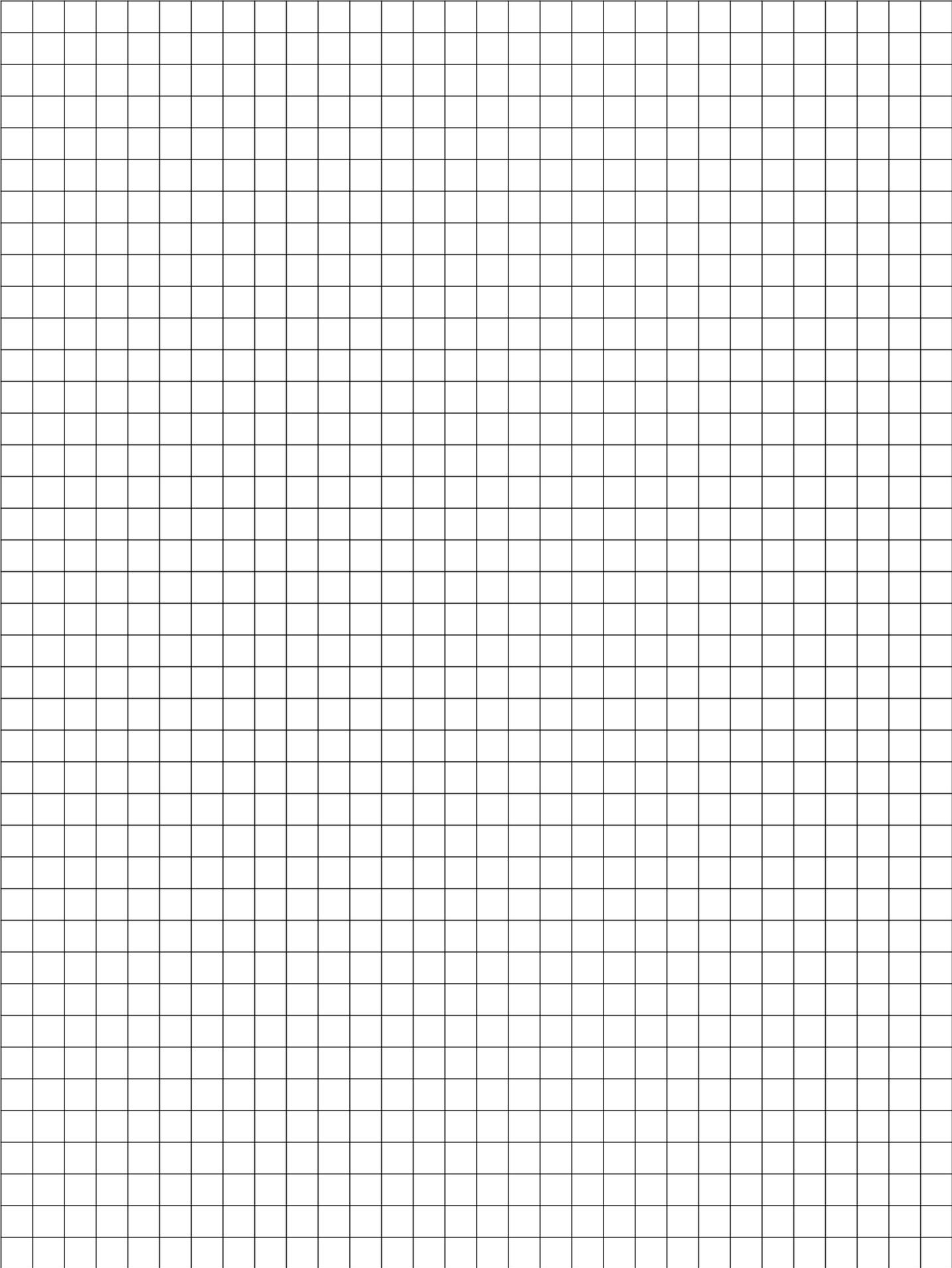
Grade 8 Task

The Sally's Car Loan Task

Sally bought a new car. Her total cost including all fees and taxes was $15,000. She made a down payment of $4300. She financed the remaining amount with no interest. Sally is going to pay off the remainder of the loan using equal monthly payments.

a. After 12 monthly payments, Sally has a remaining balance of $7460. How many months will it take for Sally to pay off the loan? Show how you decided.

b. Both of the first quadrant graphs below could be used to represent Sally's situation. Title, scale, and label the axes on each graph so that the graph makes sense in terms of Sally's situation. Address key aspects of the graph, such as the intercepts and the slope as they relate to Sally's situation.
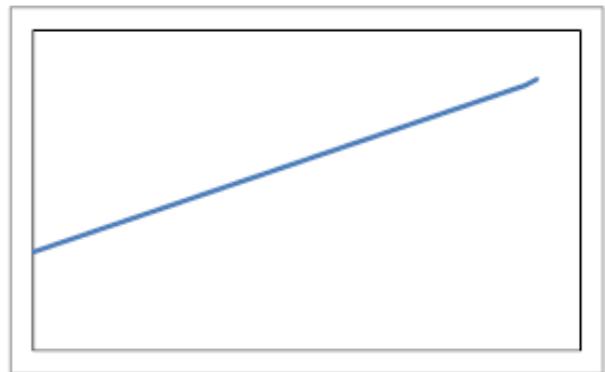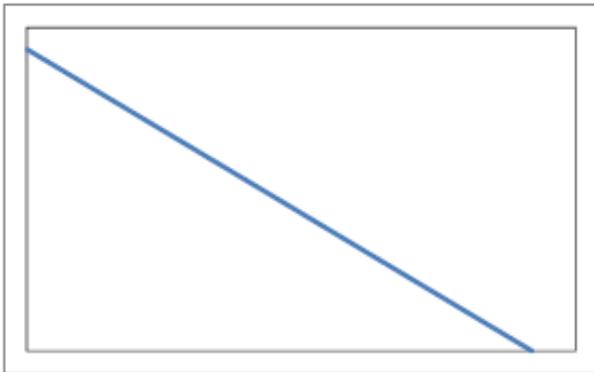
Algebra I Task

The Speeding Ticket Task

The city of Cautionville has decided to utilize a new formula for calculating the fine for speeding within their city limits. Speeding violations will be categorized in two ways: regular speeding violations and reckless driving speeding violations. To calculate the charge for each regular speeding violation, the city is enforcing a fee of $60 for each speeding ticket issued. In addition, there will be a charge of $8 for every mile per hour driven that exceeds the city-wide speed limit. The maximum charge for a regular speeding ticket is $300. Anything beyond the $300 amount is considered to be in the reckless driving category and enforces larger penalties and a mandatory court appearance for further potential consequences. The city-wide speed limit is 30 miles per hour.

A. Based on the information above, determine the cost for each of the speeds below. Show how you determined your answers.

     27 miles per hour

     38 miles per hour

     45 miles per hour

B. Write an equation that could be used to determine the total cost of a regular speeding violation ticket. Be sure to define each variable.

Use your equation to find the cost for a person driving 25 miles per hour over the speed limit. Show your work.

Use your equation to find the speed that would result in a $212 fine. Show your work.

C. Does your equation represent a function? Why or why not? If it does, what would be the domain and range of the function?

D. At what speeds does the city of Cautionville consider a driver to be reckless? Explain how you determined your answer.

Geometry Task

The Comparing Shapes Task

On a piece of graph paper with a coordinate plane, draw three non-collinear points and label them A, B, C. (Do not use the origin as one of your points.) Connect these points to make a triangle. For each point, take half of the x and y-coordinates and label these new points A', B', C'. Connect these points to make another triangle.

1. Compare the distance from the origin to point A' and from the origin to point A. Do the same for points B' and B, and for points C' and C. Describe any relationships you notice.

2. Find the perimeter of triangle ABC and find the perimeter of triangle A'B'C'. Describe any relationships that you notice.

3. Suppose you repeated the directions, but you took a third of the x and y coordinates. Make a conjecture about what would happen to the relationships you noticed in parts 1 and 2.

4. Suppose you repeated the directions, but used a different shape (e.g. quadrilateral, pentagon, hexagon). Make a conjecture about what would happen to the relationships you noticed in parts 1 and 2.

5. Verify your conjectures for numbers 3 and 4.

Extension: If students know how to find the area of non-right triangles, include this after part 2. Students will compare the area of triangle A'B'C' with the area of triangle ABC. Student should then finish the other parts of the task, making conjectures and proving them, including the areas.

The Comparing Shapes Task
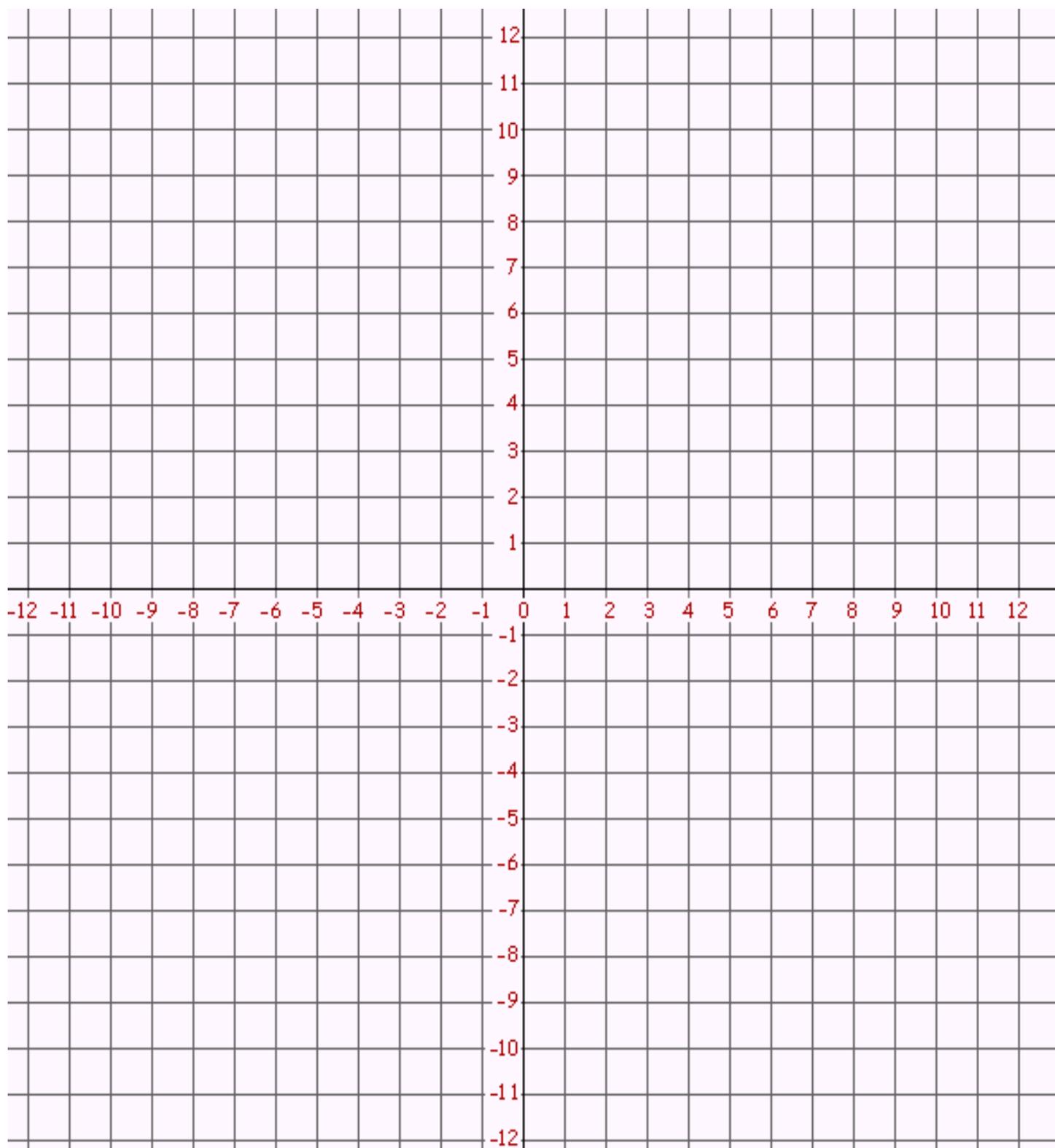
Algebra II Task

The Blogs and Frogs Task

George has two problems to consider:

Problem 1: Erin has moved to a new school in the Virgin Islands. To keep her friends up-to-date on her adventures, she started a blog. In the first week, she had five friends following her blog. Her friends thought the blog was interesting, so the next week each of her friends told two additional friends, who began following the blog. In the next week, each of the new followers from the previous week told two of their friends. This continued for several weeks.

a) Make a three-column table to represent this problem. In the first column, list the number of weeks since Erin's blog began. In the second column, tell how many NEW followers Erin's blog has attracted each week. In the last column, give the TOTAL number of followers Erin's blog has.

b) Write an expression to describe how to find the number of NEW followers Erin's blog has in week N.

c) Write an expression to describe the TOTAL number of followers Erin's blog has in week N.

Problem 2: A frog is sitting a fixed distance away from the pond. He starts hopping towards the pond. In the first hop, he jumps 1/3 of the distance between his original position and the pond. In the second hop, he jumps 1/3 of the remaining distance. In the third hop, he jumps 1/3 of the distance that remains after his second hop. This pattern continues for all of the frog's hops.

a) Make a table to represent the frog's progress after each hop. Include a column in your table to show the remaining distance after each hop.

b) Write an expression to describe how to find the remaining distance after the Nth hop.

c) Will the frog ever reach the pond? Why or why not?

George needs your help. Solve both of George's problems. Describe how these problems are similar and how these problems are different.