

Name: \_\_\_\_\_  
Algebra 1

Date: \_\_\_\_\_  
Band: \_\_\_\_\_

## Functions Unit Project

*Instructions:* Complete ALL of the following performance tasks. Read all the directions and show all your work to receive credit. **This is an independent activity that will be graded as a test.** If there is any indication of plagiarism, you will earn zero with absolutely no opportunity for a make up.

**Big Idea: Functions**

A function is a relationship that pairs one input value with exactly one output value. You can use words, tables, equations, sets of ordered pairs, and graphs to represent functions.

**Big Idea: Modeling**

You can use functions to model real-world situations that pair one input value with a unique output value.

**Performance Task 1**

*Invent a story that you can represent with a sketch. (Recall that a graph without actual data is called a sketch.)*

**A.** Write your story using two variables.

**B.** Explain why the data is discrete or continuous.

**C.** Draw a sketch to represent your story.

**D.** Label each section of the sketch.

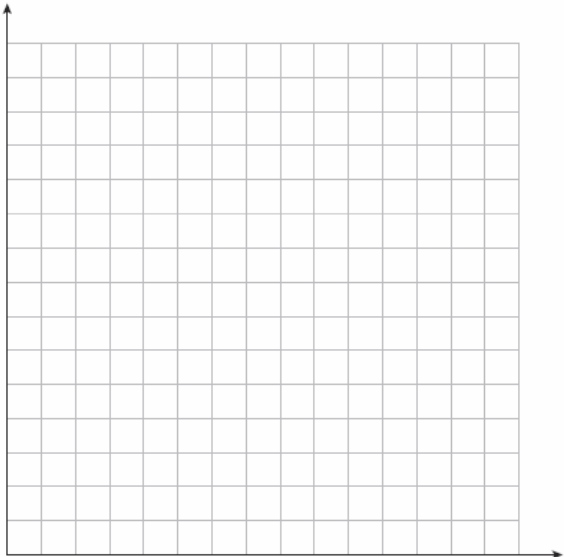
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**Performance Task 2**

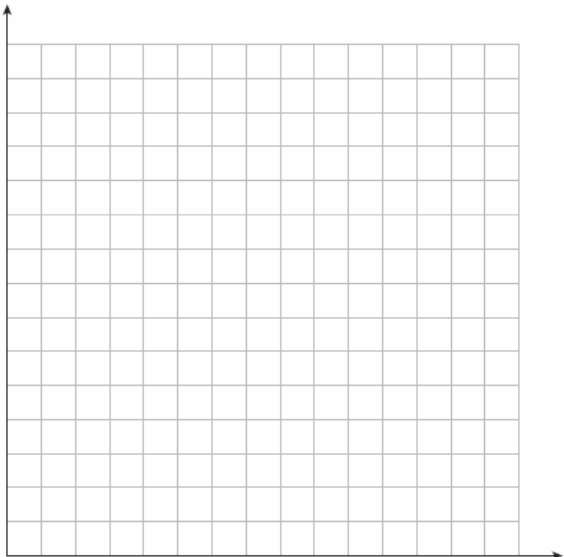
*Solve. Show your work for each part of the following task.*

You are riding your bike at a constant speed of 30 ft/s. A friend uses a stopwatch to time you as your ride along a city block that is 264 ft long.

- A.** Make a graph to represent the situation, where the independent variable is time and the dependent variable is distance traveled.



- B.** Make a second graph to represent the situation, where the independent variable is time and the dependent variable is speed.



C. Do both graphs represent functions? If so, are they linear or nonlinear? Explain.

D. Find a reasonable domain and range for each graph.

E. Write a function rule for each graph.

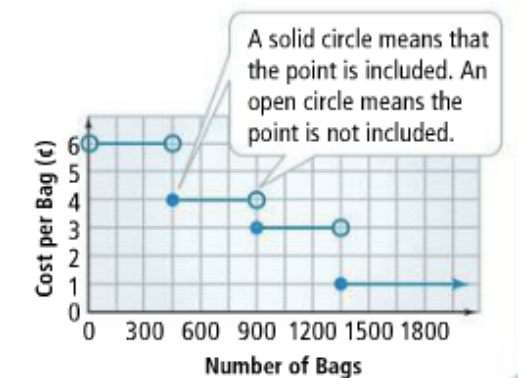
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**Performance Task 3**

Show your work for each part of the following tasks.

A shop manager is ordering shopping bags. The price per bag is determined by how many bags the manager buys. The graph at the right shows the price per bag based on the number of bags that are bought.

A. Does the graph represent a function? If so, is it *linear* or *nonlinear*? Explain.



B. Find a reasonable domain and range for the graph.

C. How much would it cost to buy 1500 bags?

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**Performance Task 4**

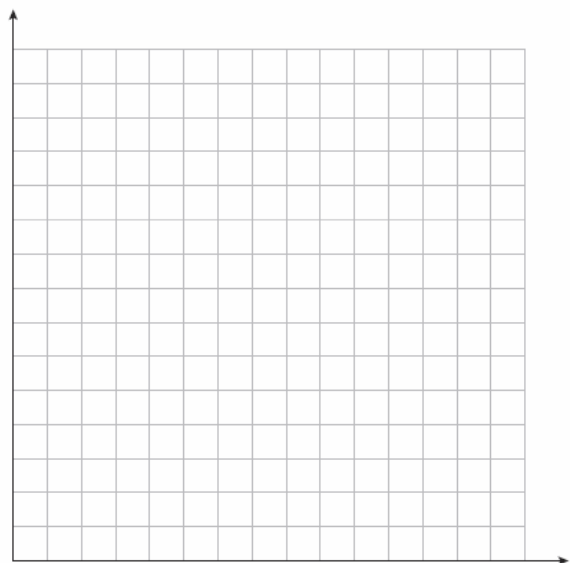
*Solve. Show your work for each part of the following tasks.*

You are making a knotted necklace. The table at the right shows the amount of string you need for different necklace lengths.

A. Identify the independent and dependent variables.

Length of Necklace (in.)	Amount of String (in.)
10	200
11	202
12	204
13	206

B. Write and graph a function rule that represents the situation.

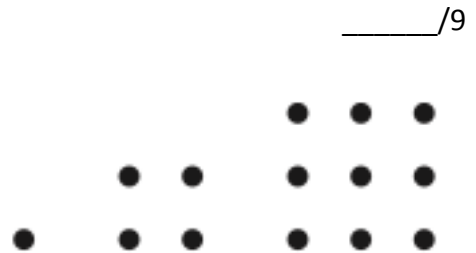


C. Is the graph *continuous* or *discrete*? Explain your reasoning.

D. How much string do you need to make a 15-in. necklace?

**Performance Task 5**

A. Your friend draws a sequence of dots for an art project as shown. List the number of dots in each of the three figures shown as well as the number of dots that will be in the next three figures.



B. State a function rule for the number of dots in each figure.

C. Your friend then draws the sequence of dots shown below. List the number of dots in each of the four figures shown as well as the number of dots that will be in the next two figures.



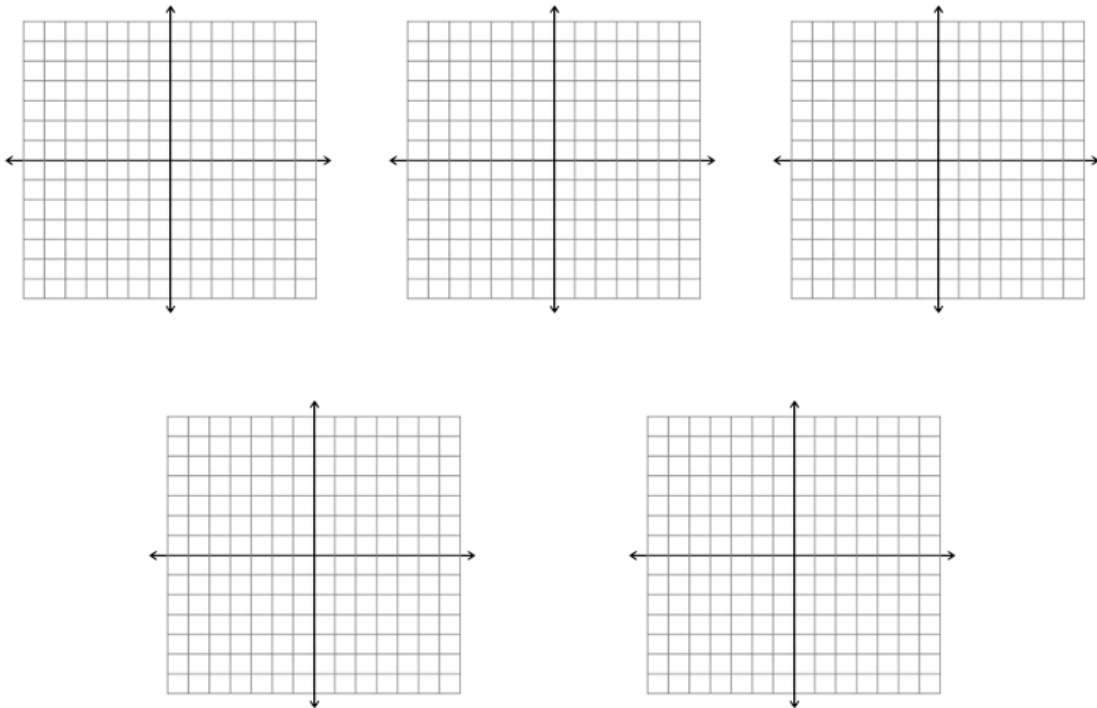
D. State a function rule for the number of dots in each figure.

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**Performance Task 6**

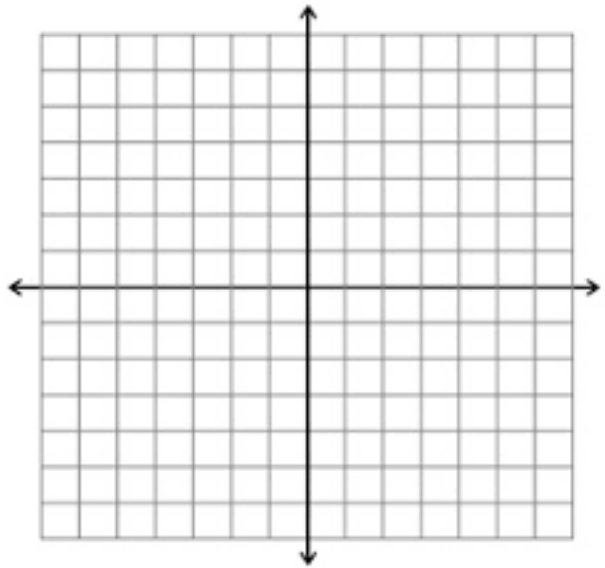
A. Write a paragraph to a friend explaining the meaning of these terms: relation, function, domain, and range.

B. Draw 3 graphs of different functions. Then draw two graphs of relations that are not functions. Label each example.



- C. Choose one of the function graphs you drew above. Create a table of values. Write a function rule for the graph.

- D. Evaluate the function rule  $y = 3x^2 + 4$  for  $x = -2$ . Explain which is the dependent variable and which is the independent variable. Graph the function.



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**Plagiarism Contract**

*Copy the paragraph then sign and date on the lines below. Your project will not be accepted unless the plagiarism contract is completed and signed.*

“I understand that this project is an independent activity and that all work I have provided is my own and no one else’s. I acknowledge that if any of my work indicates any hint of plagiarism, then I will accept a zero with absolutely no opportunity for a make up.”

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**Signature of student:** \_\_\_\_\_ **Date:** \_\_\_\_\_