Functions2 - Graphs in Context (Shapes)

Standards: **F-IF.4**

GLOs: **#1** - Self Directed Learner

Math Practices:
-Reason abstractly & quantitatively

Learning Target:
How do we graph real life situations?

Aug 21-8:43 AM

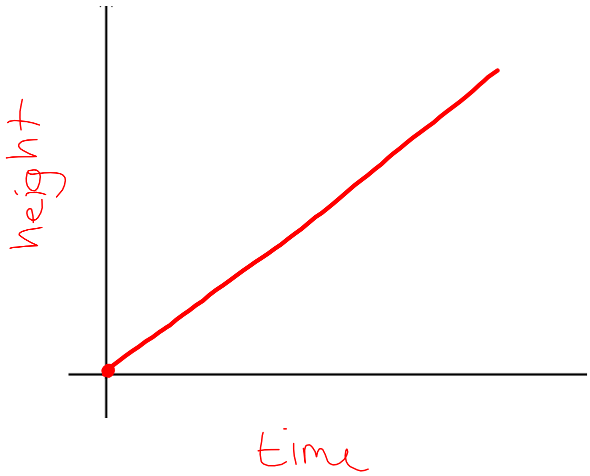
Creating Graphs:

Each of the containers below is to be placed under a faucet (one at a time) that has been turned on and left to run at a constant rate. For each, on the following page draw a rough graph of the height of the water in the container versus time, where time t = 0 corresponds to the time the individual container was placed under the faucet. You do not need to include units for either inputs or outputs, but try to make the shapes of your graphs as accurate as possible.

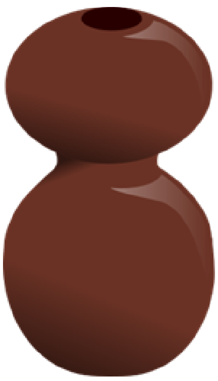
input output

A.

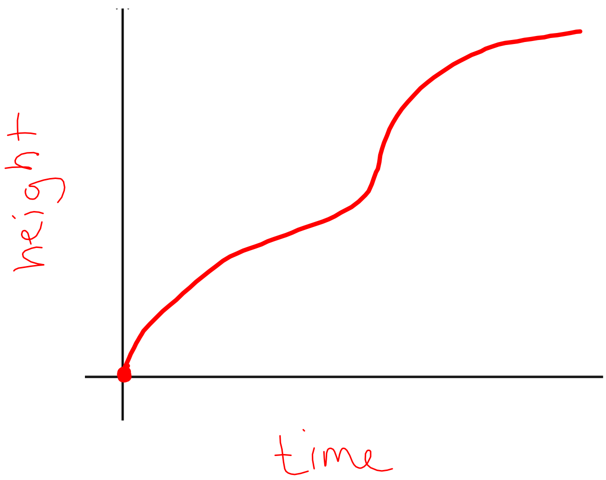
Courtesy of Wikimedia.org



B.

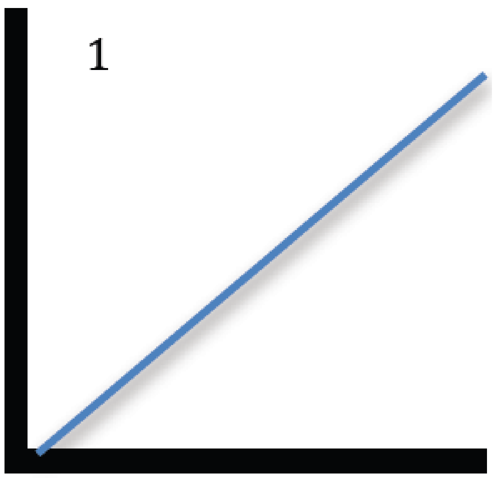


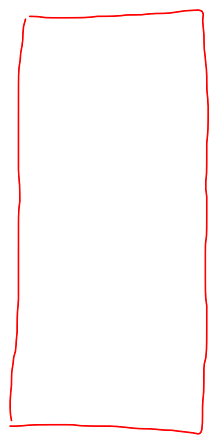
Courtesy of Wikimedia.org

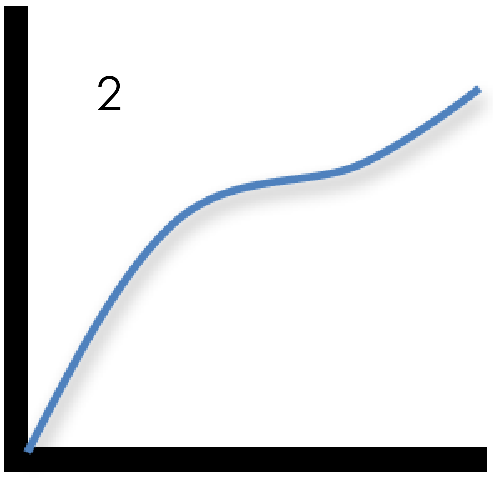


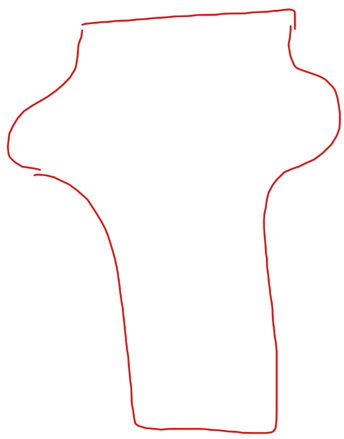
Creating Containers:

This is the dual problem to the previous page. Below is depicted a number of graphs, each representing the height of water entering a container at a constant rate versus time (i.e. the horizontal axis represents time and the vertical axis represents the height of the water in the container). Next to each, create a rough drawing of a container that would yield such a graph.







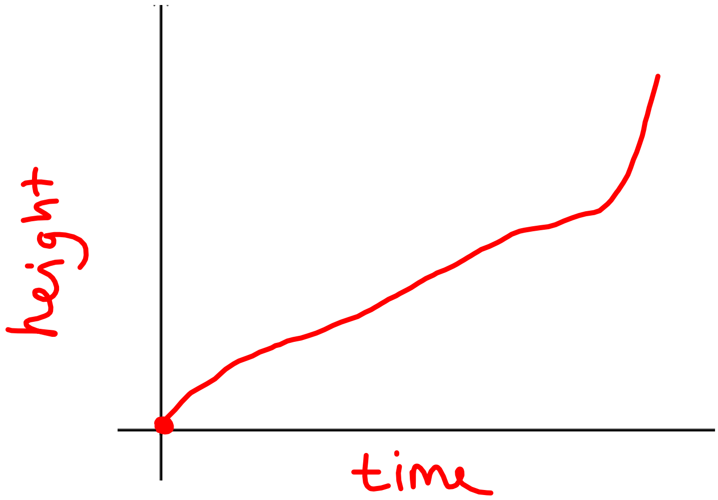


Aug 21-8:43 AM

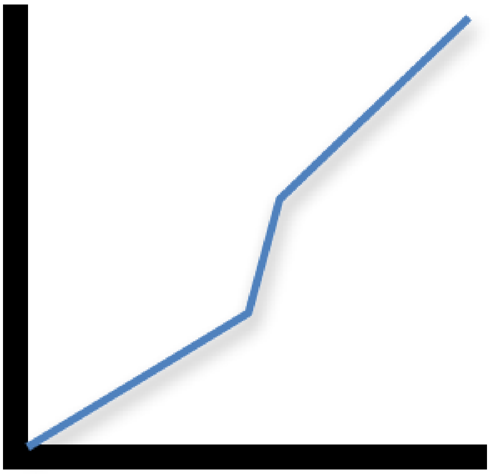
Try on your own:

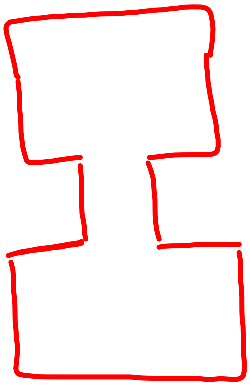
Draw a rough graph of the height of the water in the container versus time, where time $t = 0$ corresponds to the time the individual container was placed under the faucet.

Courtesy of National Music Museum
University of South Dakota



Create a rough drawing of a container that would yield such a graph for height of the water over time.





Functions2 - Graphs in Context (Shapes)

Standards: **F-IF.4**

GLOs: #2 - Community Contributor

Math Practices:
-Construct viable arguments and critique the reasoning of others

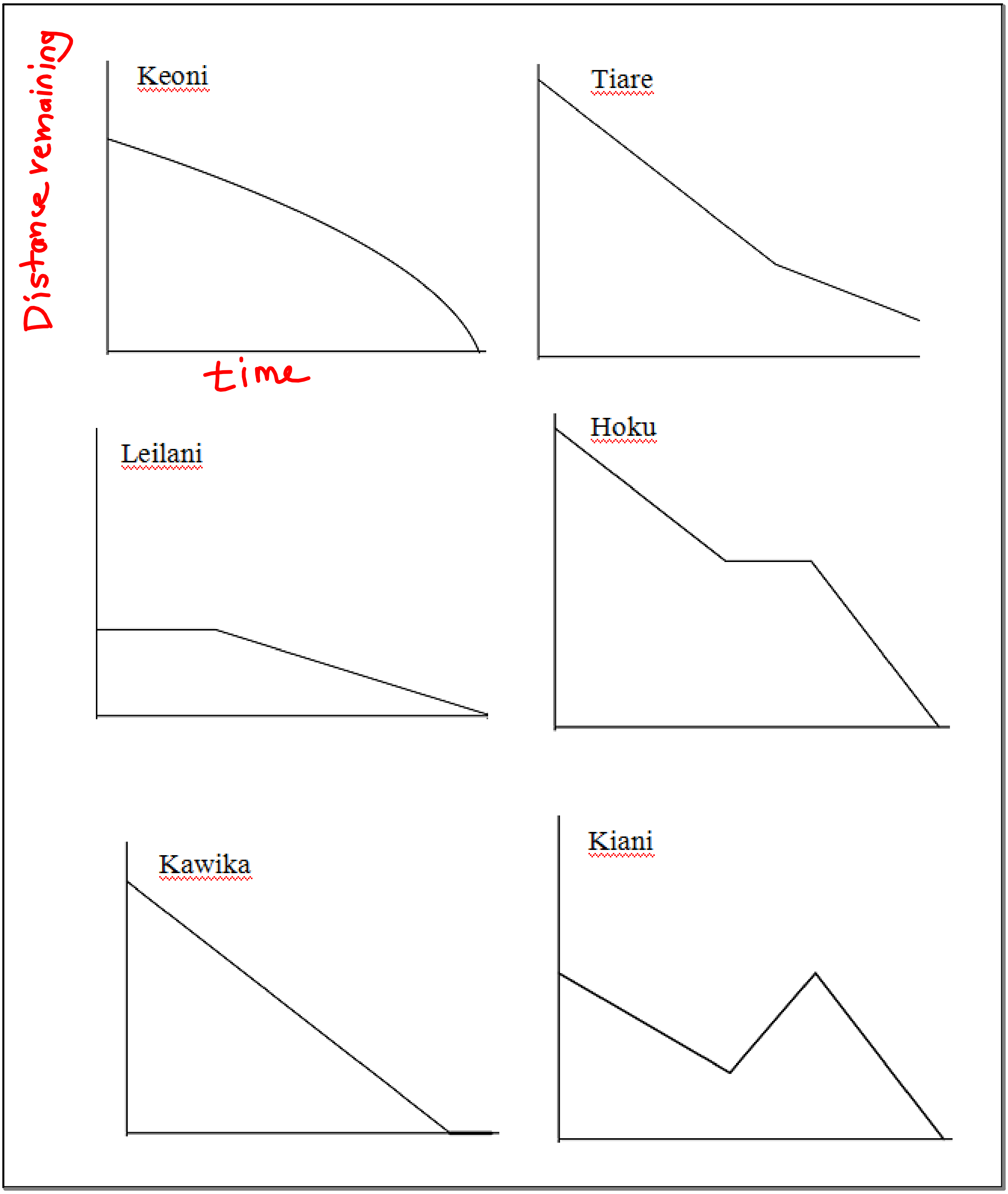
HW#6: Func 2 #1-8

Learning Target:
How do we graph real life situations?

Oct 27-5:42 PM

Interpreting Graphs: **In Groups**

Each graph below represents a student's remaining distance to the bus stop as a function of time as he/she walks to the bus stop. Each graph is based on the same time frame and uses the same distance units, but models a different story. The bus leaves the bus stop at the end of the time frame depicted. Answer the associated questions on the following page and explain how you arrived at your answers.


Distance remaining
Keoni
time
Tiare
Leilani
Hoku
Kawika
Kiani

1. Who lives the closest to the bus stop?

Leilani, she starts the lowest on the graph

2. Who left home the latest?

Leilani, the flat part of the graph shows she is still at home.

3. Who missed the bus?

Tiare, doesn't reach bus stop.

4. Who stopped at some point along the way?

Hoku, flat section

5. Who walked the fastest?

Kawika, he has most time at the end at bus stop.

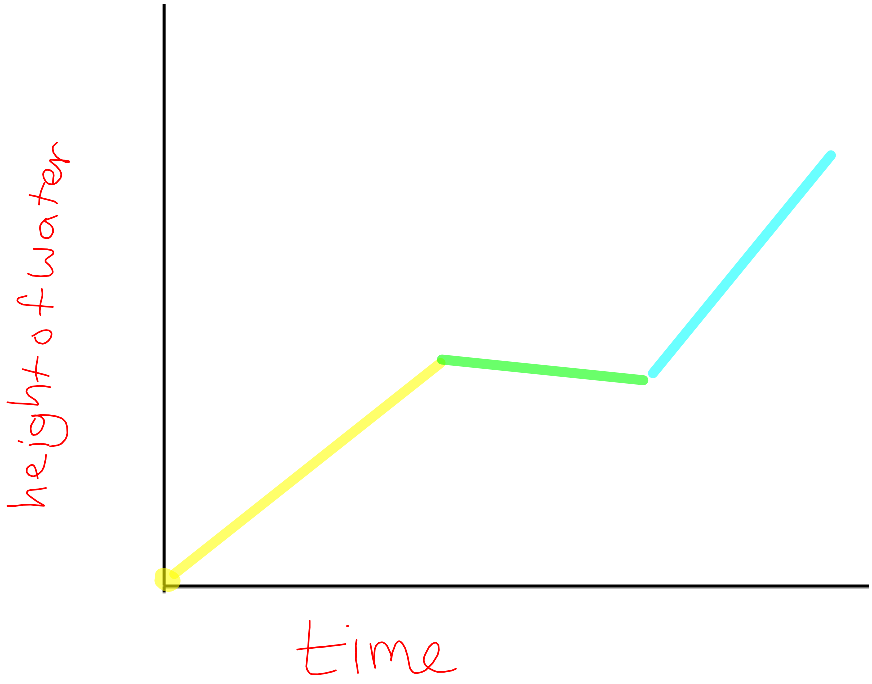
Kiani, she had to go home & back to bus stop (steepest line).

6. Who arrived at the bus stop first?

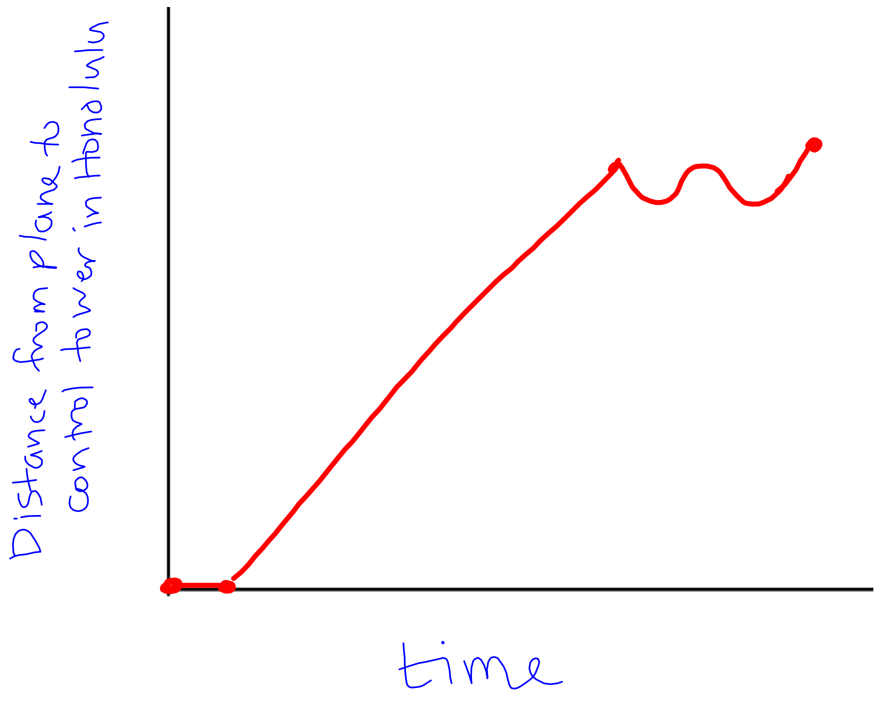
Kawika, had more time to wait at busstop.

Create a graph of each scenario below on the graph provided. Your graphs do not need to include specific details such as units or specific values.

1. Kai is filling a cooler with water at a constant rate using a hose. Kai walks away for a moment. During his absence the cooler's plug comes out and the cooler starts to drain at a rate that is just a little faster than the rate at which the water is entering the cooler. A few minutes later Kai returns to discover the cooler is leaking and he reattaches the plug and continues to fill the cooler until it is full. Graph the height of the water in the cooler versus time.

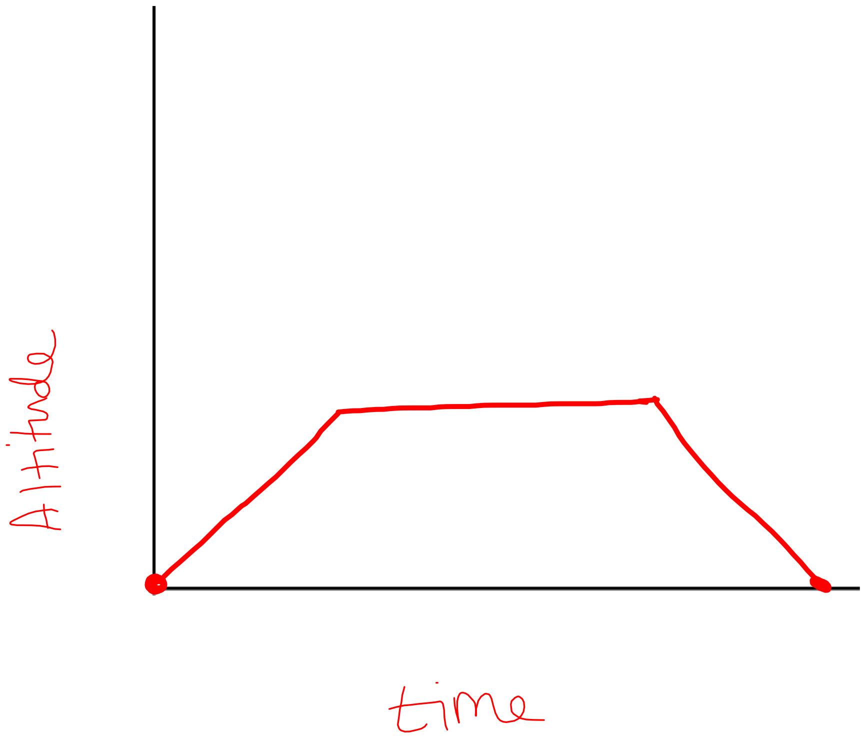


2. A flight from Honolulu bound for Hilo leaves the gate on time, but the plane has to wait on the tarmac to be cleared for take-off. Finally, a few minutes later, the plane is cleared for take off. The flight takes approximately one hour. When the plane approaches Hilo, the pilot is instructed to circle the airport twice before they are cleared for landing. A few minutes later the plane lands and parks at the gate. Graph the distance from the plane to the air traffic control tower at the Honolulu Airport versus time, where time zero corresponds to the time the plane left the gate.



Oct 28-9:12 PM

3. A passenger on the flight from Honolulu bound for Hilo (in the scenario above) is afraid of heights. She is apprehensive as the plane takes off, is seated at a window seat, and is paying close attention to the altitude of the plane during the flight. Her nervousness persists for the duration of the flight and subsides when they reach the gate in Hilo. Graph the altitude of the plane versus time.



Oct 28-9:13 PM

4. Mylea uses her cell phone constantly during the day and often her battery runs out. On one particular day she leaves home with only half a charge. She talks on the phone with her friend the whole way to school. When she gets to her first class her battery is nearly completely drained. She asks her teacher if she can charge her phone. The teacher allows her to do it "just this one time". During class she gets a two-thirds charge and then heads to her next class. The next teacher likes to incorporate technology into his lessons and asks students to respond using Poll Anywhere and Mylea's cell phone battery is nearly completely drained again. Her next two teachers will not let her charge her phone so she is very conservative with its usage for the rest of the day. Finally, she returns home and is able to get a full charge. Graph Mylea's phone's charge versus time from the time she left home for school until her phone is recharged at home. Be sure to clearly mark key times during the day.