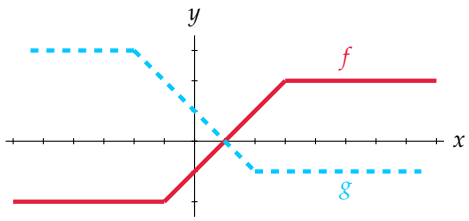
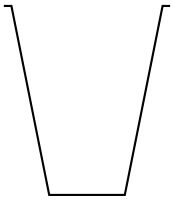
8. Suppose you are teaching the idea of inverse of a composition of invertible functions in a high school class. You want to explain why the inverse of $g \circ f$ should be $(f^{-1}) \circ (g^{-1})$ with the example of $f(x) = x + 5$ and $g(x) = 3x$.
   (a) Give an explanation from a correspondence view.
   (b) Give an explanation from a covariation view.
9. Below are graphs of the relations f and g. The pieces of these graphs are lines and line segments, and their turning points are integer coordinate points. Consecutive tick marks on the axes are distance 1 from each other.
   (a) What is the rate of change of each section of f? What is the domain of each section? What is the image of each section?
   (b) What is the rate of change of each section of g? What is the domain of each section? What is the image of each section?
   (c) How many sections are there of $g \circ f$? What are they? What is the rate of change of each section?
   (d) How would you use the above information to graph $g \circ f$? Cite specifically where you use each piece of information from (a), (b), and (c).
   (e) How did you use correspondence and covariation views in your reasoning?



Problems 10 and 11 use the diagram below. Pot B has the radial cross section shown and has a 1 gallon capacity.


Pot B

10. Let B be the function that maps volume of water in Pot B to height of water, when Pot B starts empty.
    Let C be the function that maps volume of water in Pot B to height of water, when Pot B starts with 4 cups of water already in it. (Look up how many cups are in a gallon.)
    Let v represent volume and h represent height.
    (a) Graph $h = B(v)$ and $h = C(v)$ on the same set of v-h axes.
    (b) How do the graphs of B and C relate? Why does this make sense?
11. Water in Pot D rises at twice the rate as Pot B, meaning that the rate of change of height with respect to volume for Pot D is twice that of Pot B.
    (a) If Pot D and Pot B are equally tall, does Pot D hold less volume or more volume than Pot B?
    (b) Let D be the function that maps volume of water in Pot D to height of water, when Pot D starts empty. Graph $h = B(v)$ and $h = D(v)$ on the same set of v-h axes.
    (c) Which of the following best captures the relationship between $B(v)$ and $D(v)$? Explain why.

$$B(v) = 2D(v) \text{ or } D = \frac{1}{2}B(v) \qquad B(v) = D(2v) \text{ or } D(v) = B(\frac{1}{2}v)$$

$$B(v) = \frac{1}{2}D(v) \text{ or } D = 2B(v) \qquad B(v) = D(\frac{1}{2}v) \text{ or } D = B(\frac{1}{2}v)$$