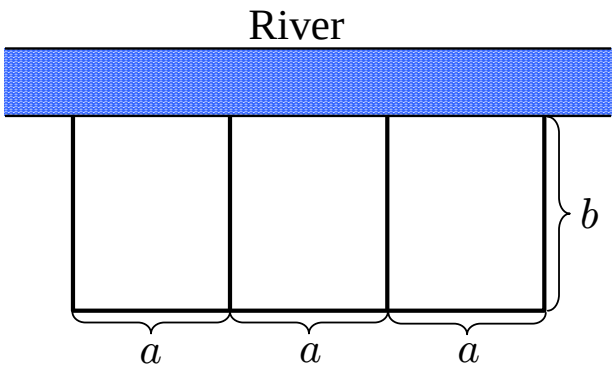
BLC 190 Name:_____

Worksheet 8

1. Bob has 15 km of fencing that he plans to use to fence off a rectangular region next to a river. In addition, he plans to use some of the fencing to subdivide the region into three smaller regions as shown below:



(a) Determine the total amount of fence used in terms of a and b (no fencing is required next to the river).

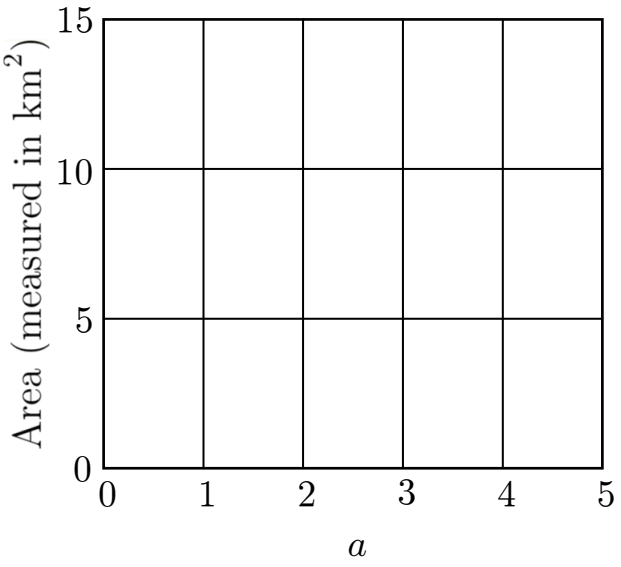
(b) Determine the area of the total region enclosed by the fence in terms of a and b.

(c) If $a = 1$ km, determine the area of the region enclosed by the fence (recall that he has 15 km of fence).

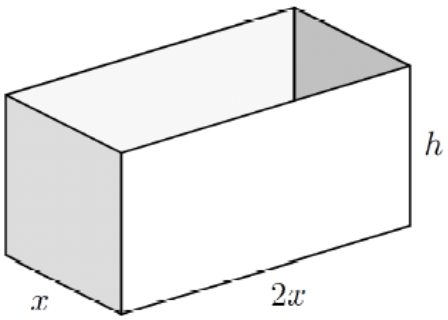
(d) If $a = 3$ km, determine the area of the region enclosed by the fence.

(e) Express the area of the region as a function of a.

(f) Sketch a graph of the function for the area of the region (from part (e)).



2. A freight company wants to manufacture large metal shipping containers. The containers will have the shape of a box with no top, and must be twice as long as they are wide:



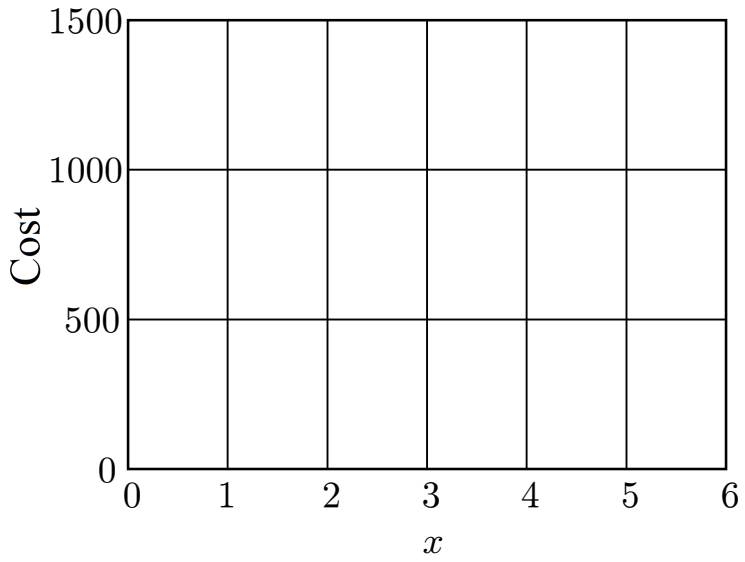
Each container is required to hold 10 cubic meters of goods. Material for the bottoms of the containers costs \$20 per square meter, and material for the sides costs \$9 per square meter.

(a) Find a formula for the total cost of one container in terms of the width x and the height h.

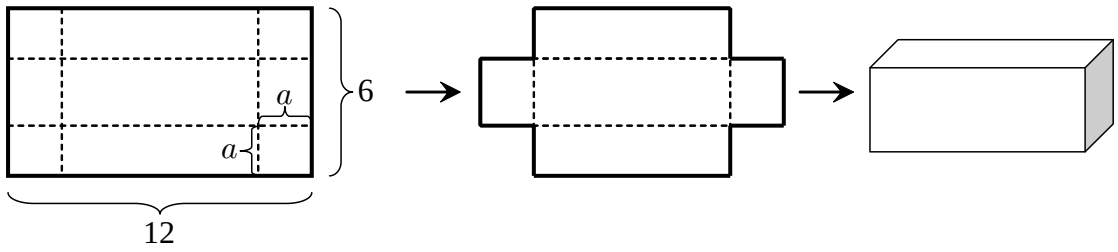
(b) Determine the volume of the box in terms of x and h.

(c) Express the total cost of the container as a function of x (recall that the volume of the container is 10 cubic meters).

(d) Sketch a graph of the function of the cost of the container (from part (c)).

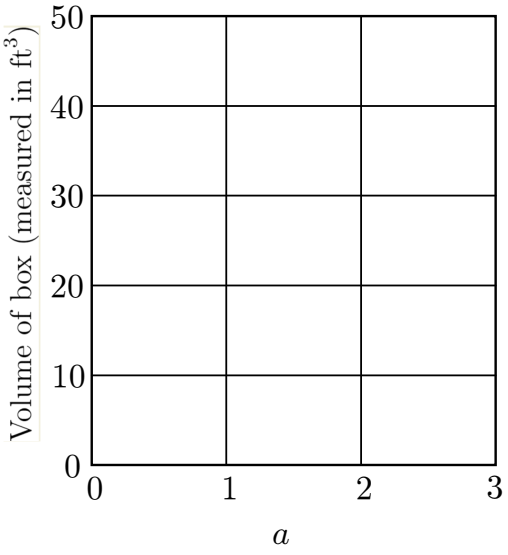


3. Carol plans to create a large open box (a box without a top) from a piece of cardboard. She has a cardboard rectangle with side lengths 6 feet and 12 feet. She will cut off a square with side length a from each corner, and then fold the resulting flaps up to create a box.

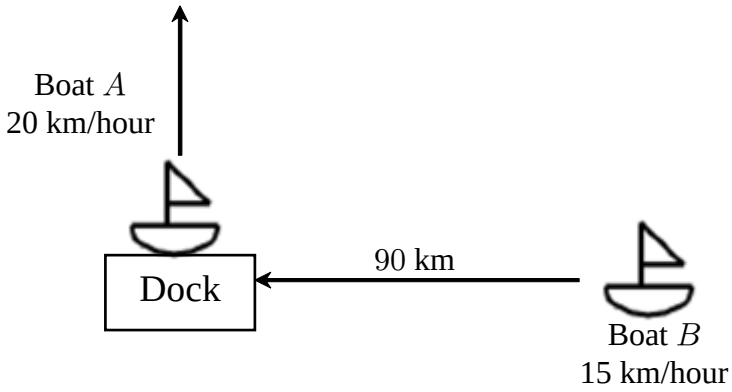


(a) Express the volume of the resulting box as a function of a.

(b) Sketch a graph of the formula for the volume of the box (from part (a)).



4. Boat A starts at a dock and travels due North at a speed of 20 km/hour. At the same time, Boat B starts 90 km East of the dock, and is sailing West at a speed of 15 km/hour.



(a) How far will Boat A be from the dock after 1 hour?

(b) How far will Boat B be from the dock after 1 hour?

(c) Determine the distance between Boats A and B after 1 hour.

(d) Determine the distances between the boats after 1 hour, 2 hours, 3 hours, 4 hours, 5 hours, and 6 hours, and then fill in the following table with the values:

1 hour	2 hours	3 hours	4 hours	5 hours	6 hours

(e) How far is Boat A from the dock after t hours?

(f) How far is Boat B from the dock after t hours?

(g) How far apart are the two boats after t hours?

(h) Sketch a graph of the formula for the distance between the two boats (from part (g)).