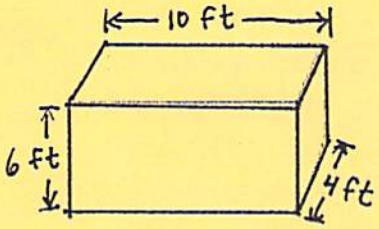
Math Theory & Problem Solving The Broken Pipe Name:_____

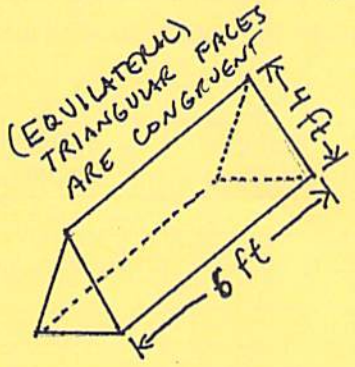
Email from a teacher:

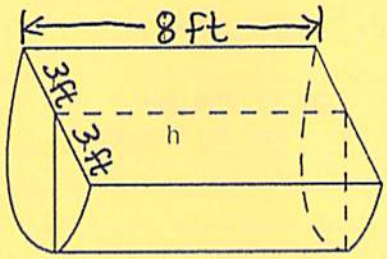
"I don't have all the details and may not be able to get them... a pipe in my room burst on Monday and caused water damage in the hallway and a total of 6 classrooms in full or in part... I have been told varying amounts as to how high the water was in my room and mere estimation by our custodial staff on how much water they themselves eliminated... the plumber said that the little copper pipe was spewing 12 gal per min...

Let's begin modeling this situation by starting on a small scale.

Compute the volume of the given bathtubs. Dimensions are given in inches.







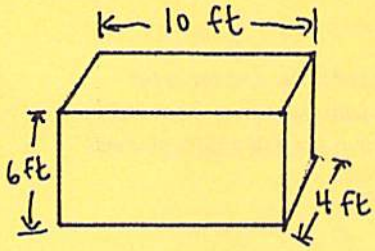
h is 8 ft
r is 3 ft

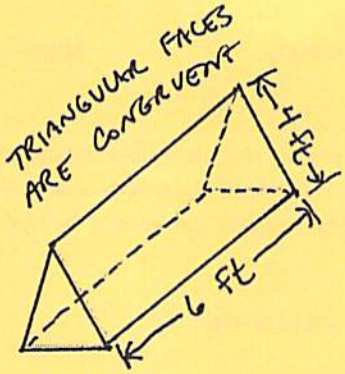
Assume each of the above bathtubs is filled at a rate of 20 gallons per minute.
Complete the table of values given for each tub.

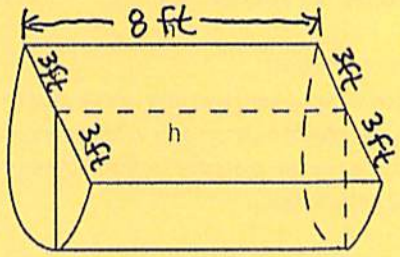
t (min)	Water volume (gal) Show your computation	% of box tub filled	% of triangular tub filled	% of half cylinder tub filled
0				
1				
2				
3				
4				
5				
6				
7				
...				
n				

Suppose we put a drain in the bottom of the tub that empties water at a rate of 8 gallons per minute that starts draining at the same time the water is running into the tub at a rate of 20 gallons per minute.

t (min)	Water volume (gal) Show your computation	% of box tub filled	% of triangular tub filled	% of half cylinder tub filled
0				
1				
2				
3				
4				
5				
6				
7				
...				
n				







h = 8 ft
r = 3 ft

Suppose we put a drain in the center of one of the parallel faces of the tub that empties water at a rate of 15 gallons per minute that starts draining at the same time the water is running into the tub at a rate of 20 gallons per minute.

t (min)	Water volume (gal) Show your computation	% of box tub filled	% of triangular tub filled	% of half cylinder tub filled
0				
1				
2				
3				
4				
5				
6				
7				
...				
n				

Suppose the copper pipe we are studying has a diameter of 1.5 inches.

Come up with a model for the situation in Geogebra. Try and answer possible questions the teacher may ask about the situation.