

Problems of the Month

May-August 2016



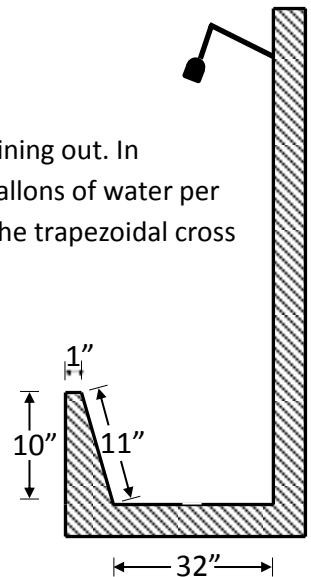
General Problem:

A sand timer has 2lbs of sand. Sand flows from the upper to the lower section at a rate of 0.2lbs/min. How long does it take for all the sand to flow to the bottom?

Calculus Problem:

A shower has a clogged drain, and so more water is entering the shower than is draining out. In particular, this shower uses 2 gallons of water per minute, but is only draining 0.5 gallons of water per minute. The shower has vertical walls on three sides, with the short edge slanted. The trapezoidal cross section is shown here. The shower is 50 inches long on the axis not shown here.

When the water is at a height a typical person would call “half full”, how fast is the water rising?



Challenge Problem:

In a certain dice game, a player scores the total of a series of rolls of a six-sided die, provided a one is never rolled. The player is allowed to roll as many times as they like and stop whenever they like. What is the probability that they will score 6 or more points in a single turn if that is their goal?

