2017-2018 Puzzle Contests

Solutions for Contest #2

Grades 5up Puzzle Solutions:

1. A coven of witches invited to the Annual Halloween Witch Party flew to the North Ridge Witch Retreat, where the Party was held. Morgan Tombend, the groundskeeper at the Retreat, noticed that as the coven approached the North Ridge, it formed a triangle: the Chief Witch on her broom in the front, followed by two witches on their brooms in the second row, then 3 in the third row, etc. When the coven landed, and the witches left their brooms on the clearing before running in for the party, Morgan Tombend noticed that the brooms formed a square (the brooms were in rows, with the same number of brooms per row, and the same number of rows as the number of brooms in each row). How many witches were in the cove, if each with had just one broom and there were less than 100 witches in the cove? **(25 pts.)**

Solution: There were 36 witches, 6 per row in the square or 1+2+3+4+5+6+7+8 in a triangle.

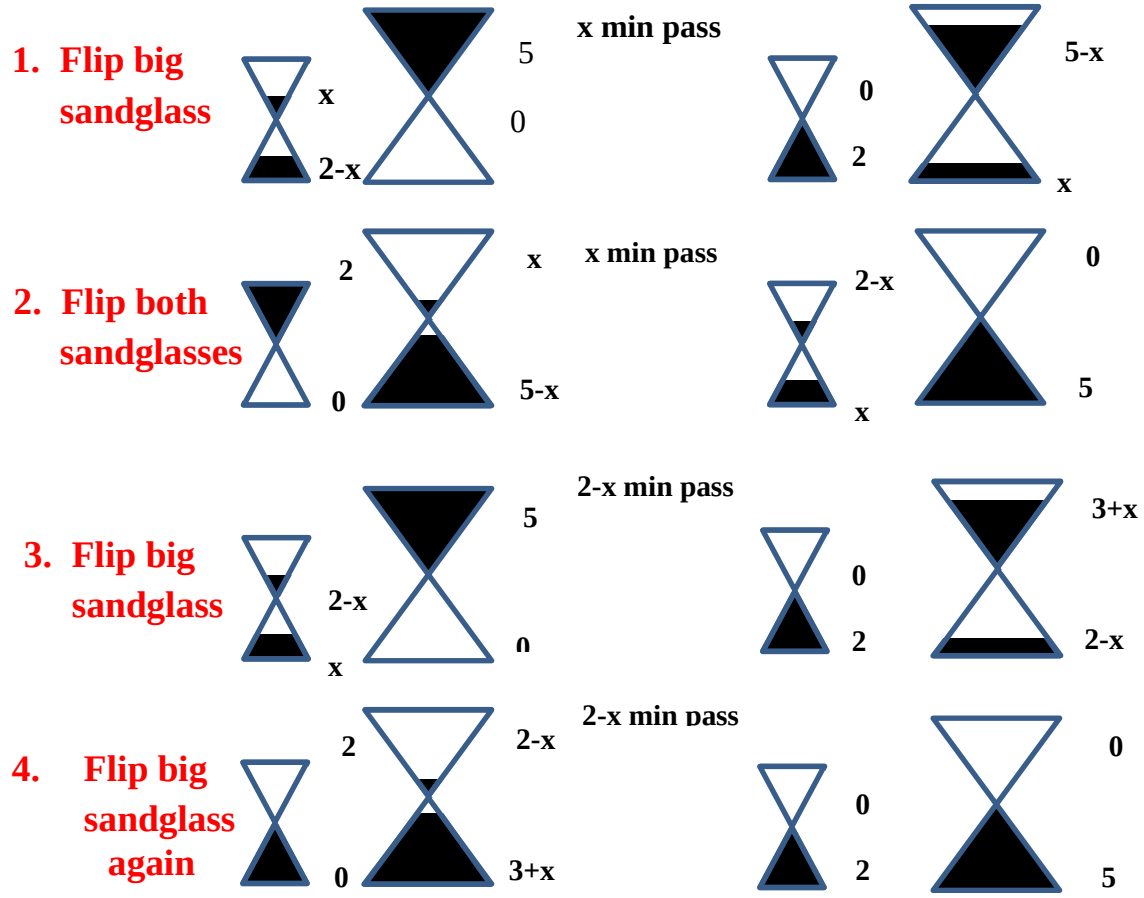
2. A very curious gentleman set out to find the Witch Party at the North Ridge. He did not however know the way, and got terribly lost on his way. Wondering along a wood path he came across a witch who promised to tell him the way to North Ridge if only he gave her his IPad. She said "Go straight north until you come to a tower. Then take a left and walk the same distance through the forest. Then turn south and walk through the bogs half the distance you will have walked to the place you turned south from where we are now. When you reach a path that is at a right angle to your path through the bog, take a left and this time you need to walk one third of the way you would have covered from here to the place you reach that path. When you get there, you will find the North Ridge Retreat." Will the Gentleman reach the Retreat? Show his route. **(30 pts.)**

Solution: No he should not. If he follows the witch's instructions, he will come back to where he is standing now, in the middle of the meadow.

3. A witch received two sandglasses as a Halloween gift. One was a 2 minute sandglass and the other a 5 minute sandglass. The witch had to boil her potion for exactly 8 minutes after the potion comes to a boil. She decided to measure the time using her new sandglasses. Unfortunately, just when the potion came to boil, she noticed that some part of the sand in the first (2-minute) sandglass was still in the top half. All the sand in the second (5-minute) sandglass was at the bottom. Could she nevertheless find a way to measure exactly 8 minutes using just the two sunglasses and take the cauldron off the fire on time? (The sand falls with a constant speed, and the time needed to flip the sandglass is negligible.) **(45 pts.)**

Answer: See the solution below

Solution: Denote x the remained time in the top part of the small sandglass. Then see the following steps below



Note that $x + x + (2 - x) + (2 - x) = 4$ min are gone from the step 1 to the step 4. independently on what the value of x is really. After that she can use the small sandglass to measure more 4 min.