

RECENT PAPER DECENT PUZZLE

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THE MARTINI

PUZZLE # 038

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The Question

It's hard to drink exactly half of a martini. If you drink half the height, then you had more than half of the volume, since the glass is wider at the top than the bottom.

You have a martini glass that's full. It's a normal cone shaped glass, with the edges at 45°. You want to drink half of the martini. What height should the liquid be at, in terms of a percentage of the original height if you have exactly half of the drink?



Fig 1: Martini filled to the top

Dimensions Of The Full Martini Glass

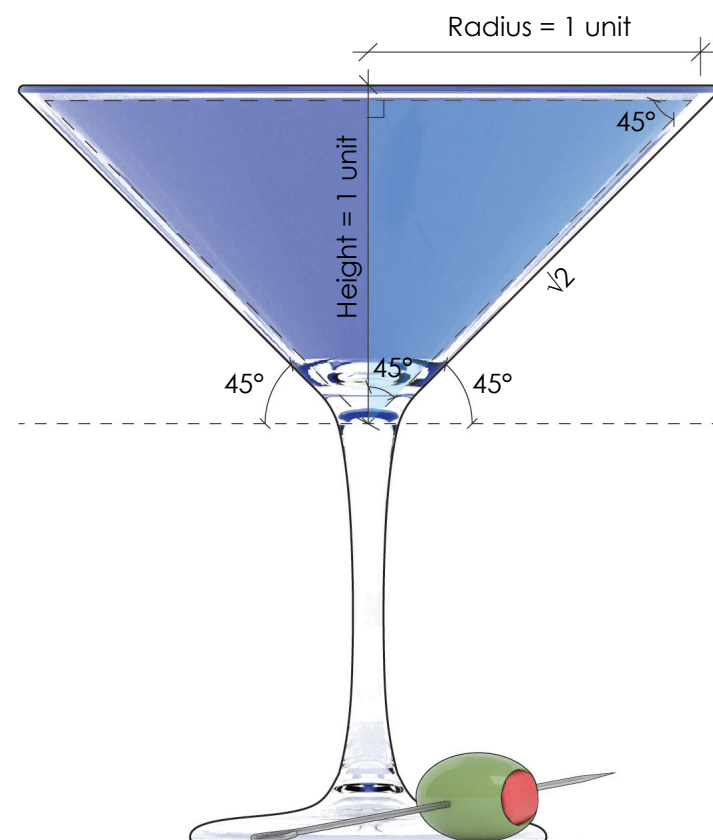


Fig 2: Elevation of full martini glass

Volume Of The Martini Glass:

To start this puzzle, the first step is to find out the volume of the full martini glass:

$$V_{\text{cone}} = \pi r^2(h/3)$$

Since the edge of the glass is at 45°, we know that the height and the radius are the same. The glass is full, so we will set those values to 1 unit.

$$V_{\text{cone}} = \pi(1)^2(1/3)$$

$$V_{\text{cone}} = \pi/3 = 1.0472 \text{ units}^3$$

Dimensions Of The Half-Filled Martini Glass

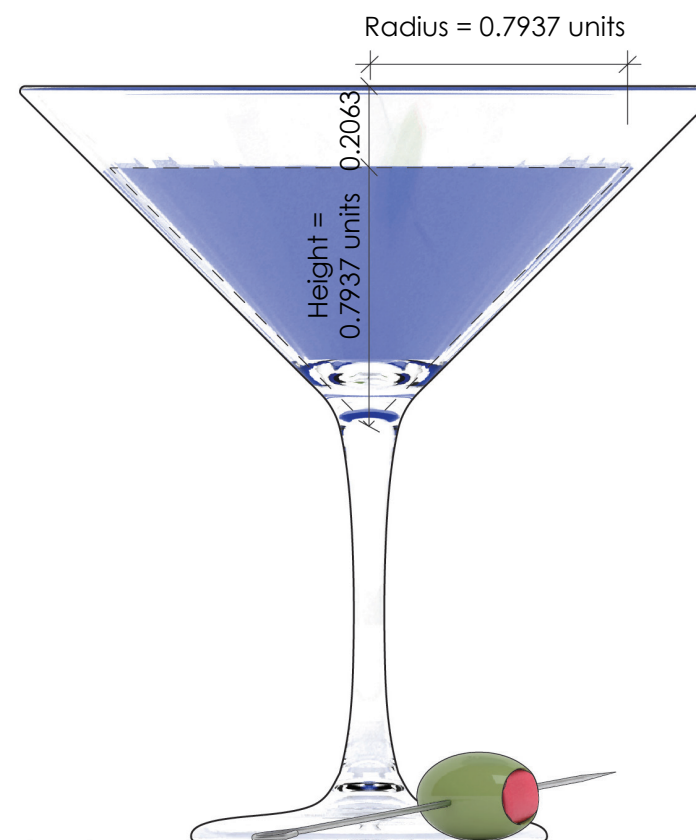


Fig 3: Elevation of half a martini

Height Of The Liquid In Half A Martini

If the volume of a full martini is $\pi/3$, then the volume of half a martini is:

$$(\pi/3)/2 = \pi/6 = 0.5236 \text{ units}^3$$

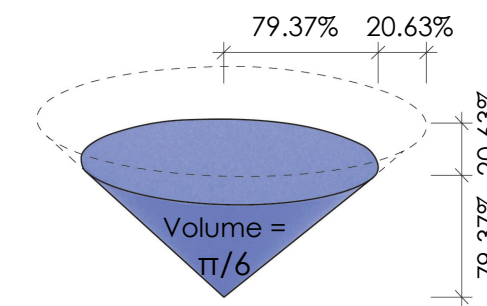
We need to find the height, and we know that the height of the liquid and the radius have to be the same. We can set $r = h$.

$$\pi/6 = \pi h^2(h/3)$$

$$1/2 = h^3$$

$$h = 0.7937 \text{ units} = 79.37\% \text{ of original height}$$

Solution



After drinking half of the martini, the height of the liquid is at 79.37% of the original height.