MATHCOUNTS® Problem of the Week Archive

Pool Maintenance – May 29, 2017

Problems & Solutions

Every Memorial Day weekend, Jay's family fills up their pool for the summer season. Since Jay's favorite subject is math, he decided to calculate how long it will take for the pool to fill. Jay times the water exiting their garden hose and figures out it's flowing at a rate of 10 gallons per minute. Their rectangular pool is 16 feet long and 8 feet wide, and they fill the pool till the water is 4 feet deep. The last thing Jay needs for his calculation is the conversion between gallons and cubic feet. He searches on the internet and finds that 1 gallon is equal to 2/15 of a cubic foot. Jay calculates the number of hours he will have to wait for his pool to be filled. How long will Jay have to wait? Express your answer to the nearest tenth.

The volume needed to fill the pool is $16 \times 8 \times 4 = 512$ ft^3. Jay's hose dispenses water at a rate of 10 gal/minute or 10 gal/minute $\times$ 2/15 ft^3/gal $\times$ 60 minutes/hour = 80 ft^3/hour. This means Jay will have to wait $512 \div 80 =$ ***6.4*** *hours for the pool to fill completely.*

Once the pool is filled, Jay needs to add chlorine. The instructions say to add 1 ounce of chlorine for every 7500 gallons of water. How much chlorine should Jay add? Express your answer to the nearest tenth.

We know from our previous calculation that Jay's pool is 512 ft^3 in volume or $512 \div 2/15 = 3840$ gallons. Since every 7500 gallons of water needs 1 ounce of chlorine, Jay will need to add $3840 \div 7500 = 0.512$ ounces, or approximately ***0.5*** *ounces.*

Jay notices that due to evaporation, his pool level is dropping around 1 inch per week. If Jay wants to maintain his pool level, how many gallons of water per day should he be adding to account for evaporation? Express your answer to the nearest tenth.

We know the dimensions of Jay's pool are 16 feet by 8 feet, so if he is losing 1 inch (or 1/12 foot) of water per week, then he is losing $16 \times 8 \times 1/12 = 32/3$ ft^3 per week or $32/3 \div 2/15 = 80$ gallons per week. Each day he should be adding $80 \div 7 \approx$ ***11.4*** *gallons.*

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