

# MATHCOUNTS<sup>®</sup> Problem of the Week Archive

## Care for Some Water? – August 1, 2022

### Problems & Solutions

In these summer months, a common problem people suffer from is dehydration – not enough water in their body. Waiting until you feel thirsty is not a good indicator that it's time to drink water. In fact, once thirst has settled in, you are already dehydrated! A general guideline is that people should drink eight 8-ounce glasses of water per day. According to this guideline, how many gallons of water should a person drink in a day? Express your answer as a decimal to the nearest tenth. (One gallon is equivalent to 4 quarts, and a quart is equivalent to 32 ounces.)

*Eight 8-ounce glasses of water is 64 ounces. Since it takes exactly double that amount, or 128 ounces, for a gallon, the guideline for water consumption is **0.5** gallons of water per day.*

When dehydrated, your body needs water. Juices and sodas are not the optimal beverages for replenishing your body with the water it needs. And if you take cost into account, you'll definitely want to grab a glass of water! It is estimated that 4000 glasses of tap water cost the same as a six-pack of soda. If a six-pack of soda costs \$1.80, how many glasses of water would cost ten cents? Express your answer to the nearest whole number.

*If a six-pack of soda costs \$1.80, then a glass of water would cost  $1.80 \div 4000$ , which is 0.00045 cents. We need to figure out how many of these would total 10 cents. In other words, let's let  $x$  = the number of glasses of water. Then,  $0.00045x = 0.10$ . Dividing both sides by 0.00045, we see that  $x \approx$  **222** glasses of water, to the nearest whole number.*

Lake Tahoe is the second deepest lake in the U.S., and it holds 40 trillion gallons of water – enough to cover the state of California to a depth of 14 inches! If one cubic foot of water is equivalent to 7.48 gallons of water and there are 5280 feet in a mile, how many square miles are in the area of California? Express your answer to the nearest thousand.

*First, 40 trillion gallons of water is equivalent to  $40 \text{ trillion} \div 7.48 = 5.3475936$  trillion cubic feet of water. Since the depth of the water in California would be 14 inches, or  $14 \div 12 = 1.16666\dots$  feet, the surface area of California must be  $5.3475936 \text{ trillion} \div 1.16666\dots = 4.5836517$  trillion square feet. Now, we need to convert square feet into square miles. Since there are 5280 feet in a mile, there are  $5280 \times 5280 = 27,878,400$  square feet in a square mile. So, dividing 4.5836517 trillion by 27,878,400 gives us that the surface area of California is **164,000** square miles to the nearest thousand square miles.*

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### ***Problems***

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