

MATHCOUNTS[®] Problem of the Week Archive

Father's Day – June 10, 2019

Problems & Solutions

For Father's Day, Martin's family is having a barbecue. Martin is making the lemonade. If the directions calls for 2 tablespoons of mix per quart of water, how many tablespoons of mix are needed to make 1.5 gallons of lemonade?

Since there are 4 quarts in a gallon, it follows that $4 \times 2 = 8$ tablespoons of mix are required per gallon of water, and half that amount, or $8/2 = 4$ tablespoons of mix are required per 0.5 gallon of water. Therefore, to make 1.5 gallons of lemonade, Martin needs to use $8 + 4 = \mathbf{12}$ tablespoons of mix.

Martin's brother is grilling the food. He puts 2 more burgers than hot dogs on the grill and 3 more ears of corn than hot dogs. In total, there are 20 items on the grill. How many ears of corn are on the grill?

Let b , h and c represent the numbers of burgers, hot dogs and ears of corn, respectively. Based on the information provided, we can set up the following equations: $b = h + 2$, $c = h + 3$ and $b + h + c = 20$. We now have a system of three equations in three variables. We can solve by substituting $h + 2$ and $h + 3$ for b and c , respectively in the equation $b + h + c = 20$. Doing so, we get $(h + 2) + h + (h + 3) = 20 \rightarrow 3h + 5 = 20 \rightarrow h = 5$ hot dogs. Since $c = h + 3$ and $h = 5$, we substitute and find that there are $c = 5 + 3 = \mathbf{8}$ ears of corn on the grill.

Martin's dad is 6'2" tall, but while playing catch with the football, Martin notices that his dad's shadow is only 2 feet long. If one of the trees in their backyard casts a shadow that was 11 feet long at the same time, how tall is the tree, in feet? Express your answer to the nearest whole number.

Since there are 12 inches in a foot, Martin's dad is $6 + 2/12 = 6 \frac{1}{6} = \frac{37}{6}$ feet tall. Now we can set the proportion between the ratio of the shadow lengths of Martin's dad and the tree and the ratio of the heights of Martin's dad and the tree. We have $2/11 = (\frac{37}{6})/t$, where t represents the height of the tree. Cross-multiplying, we get $2 \times t = 11 \times (\frac{37}{6}) \rightarrow 2t = 407/6 \rightarrow t = (\frac{407}{6})(1/2) = 407/12 = 33.916666... \approx \mathbf{34}$ feet.

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