

MATHCOUNTS[®] Problem of the Week Archive

Spring Training – April 1, 2024

Problems & Solutions

Luis plans to purchase some new baseball bats and gloves before spring training begins. Luis wants to buy the same bats and gloves he purchased last spring, but he can't remember the price of each item. Luis recalls making two purchases last spring, each totaling \$135 and both tax exempt. The first purchase was for a glove and three bats. The second purchase was for two gloves and a bat. If the current prices of these items are the same as last spring, how much will Luis pay this spring for three gloves and four bats?

If we let g and b represent the prices of a glove and a bat, respectively, we can derive two equations: $g + 3b = 135$ and $2g + b = 135$. We want to determine the price of three gloves and four bats. Combined, the two purchases from last spring were for $(g + 3b) + (2g + b) = 3g + 4b$, which is three gloves and four bats. So, we can add the two totals to find that the price is $135 + 135 = \$270$.

Based on the information from the previous problem, how many bats can Luis purchase for the same amount he would pay for three gloves?

From the previous problem, we know that $g + 3b = 135$ and $2g + b = 135$, so we can set the two expressions equal to one another to get the equation $g + 3b = 2g + b$. Simplifying, we get $2b = g$. That means each glove Luis purchases costs the same amount as two bats. Therefore, for the same amount paid for three gloves, Luis could purchase $3 \times 2 = 6$ bats.

Luis has \$300 budgeted for the purchase of new baseball bats and gloves this spring. Luis needs to purchase a minimum of two new bats and two new gloves, and he wants to spend as much as possible of the budgeted amount. Based on the previous problems, what is the greatest number of bats Luis can purchase?

In the previous problem, we determined that $2b = g$. We can substitute in the equation $g + 3b = 135$ to get $2b + 3b = 135$. Simplifying and solving, we find that the price of a bat is $5b = 135 \rightarrow b = \27 . That means price of a glove is $2 \times 27 = \$54$. Let's first determine the greatest number of bats Luis can purchase along with two gloves. The price of two gloves is $2 \times 54 = \$108$. That leaves $300 - 108 = \$192$ to spend on bats. Since $192 \div 27 = 7 \frac{1}{9}$, Luis can purchase seven bats for a total of $27 \times 7 = \$189$. Luis will spend $108 + 189 = \$297$ to purchase two gloves and seven bats. Now, let's see if this maximizes the amount he can spend of the \$300 budget. The GCF of 27 and 54 is 27, and $300 \div 27 = 11 \frac{1}{9}$. Of the \$300, Luis can spend no more than $27 \times 11 = \$297$ purchasing bats and gloves. Therefore, using as much as possible of the budget, the greatest number of bats Luis can purchase (along with at least two gloves) is 7 bats.

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