MATHCOUNTS® Problem of the Week Archive

Three Little Piggy Banks – October 4, 2021

Problems & Solutions

When Lucas dumped the coins out of his piggy bank, he noticed that there were only nickels and dimes, and the number of nickels was twice the number of dimes. If there were 50 nickels, what was the total value of the coins Lucas dumped out of his piggy bank?

*Let N and D represent the quantities of nickels and dimes Lucas dumped out of his piggy bank, respectively. From the information given, we know that N = 2D and N = 50 nickels. Setting these expressions equal to each other yields 2D = 50, so D = 25 dimes. The total value of 50 nickels and 25 dimes is 0.05(50) + 0.10(25) = 2.50 + 2.50 = $**5.00**.*

When Franco dumped the coins out of his piggy bank, he noticed that there were only nickels and quarters, and the number of quarters was six more than half the number of nickels. If the total value of the coins Franco and Lucas dumped out of each piggy bank was the same, how many coins did Franco dump out of his piggy bank?

*Let N and Q represent the quantities of nickels and quarters Franco dumped out of his piggy bank, respectively. From the previous problem and from the information provided, we know that Q = 0.5N + 6 and 0.05N + 0.25Q = 5.00 $\rightarrow$ N + 5Q = 100. Solving the first equation for N, we get N = (Q – 6)/0.5 = 2Q – 12. Substituting this expression for N in the second equation and solving for Q, we get 2Q – 12 + 5Q = 100 $\rightarrow$ 7Q = 112 $\rightarrow$ Q = 16 quarters. That means N = 2(16) – 12 = 32 – 12 = 20 nickels. Therefore, we can conclude that the number of coins Franco dumped out of his piggy bank was 16 + 20 = **36** coins.*

When Callie dumped the coins out of her piggy bank, she noticed that there were only nickels, dimes and quarters. The number of dimes was one more than twice the number of quarters, and there were half as many quarters as nickels. The coins dumped out of Callie's piggy bank had a total value equal to that of the coins dumped out of Franco's and Lucas' piggy banks combined. What was the total value of the nickels and dimes dumped out of Callie's piggy bank?

*Let N, D and Q represent the quantities of nickels, dimes and quarters Callie dumped out of her piggy bank, respectively. From the previous problems we know that the combined value of the coins dumped out of Franco's and Lucas' piggy banks is 5.00 + 5.00 = $10.00, and from the information provided, we know that N = 2Q, D = 2Q + 1 and 0.05N + 0.10D + 0.25Q = 10.00 $\rightarrow$ N + 2D + 5Q = 200. Substituting 2Q + 1 and 2Q for N and D, respectively, we get 2Q + 2(2Q + 1) + 5Q = 200 $\rightarrow$ 2Q + 4Q + 2 + 5Q = 200 $\rightarrow$ 11Q = 198 $\rightarrow$ Q = 18 quarters. It follows, then, that N = 2(18) = 36 nickels and D = 2(18) + 1 = 36 + 1 = 37 dimes. The total value of the nickels and dimes dumped out of Callie's piggy bank is 36(0.5) + 37(0.10) = 1.8 + 3.7 = $**5.50**.*

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