Puzzle of the Week
Mystery Sums – 2

THE CHALLENGE: There are five boxes to weigh and mail, and each of them weighs under 20 pounds. Unfortunately, the one available scale only weighs things over 20 pounds. The packages, weighed in pairs, weigh 22, 24, 25, 26, 27, 28, 29, 30, 32, and 33 pounds. How much does each package weigh?

22 24 25 26 27 28 29 30 32 33

EXPLORATION: Make up a few of these problems for your friends. See if you can come up with a general method for solving this kind of puzzle.

Puzzle of the Week
Mystery Sums – 2 – Notes

THE CHALLENGE & EXPLORATION: Each box is weighed four times in the process of weighing all the pairs of boxes. Therefore, if we add up all ten weights, we will find out what four times the total weight of the boxes is. If we divide this number by four, we will have the sum of their weights.

Adding up the weights we get 22 + 24 + 25 + 26 + 27 + 28 + 29 + 30 + 32 + 33 = 276. So, the total weight of the boxes is 276 / 4 = 69 pounds.

Let the weights of the boxes in order, from lightest to heaviest, be A, B, C, D, and E. Then A + B + C + D + E = 69. To get the smallest weight of a pair, we must add A and B, so A + B = 22. Similarly for the heaviest, D + E = 33. Consequently, 69 = (A + B) + C + (D + E) = 22 + C + 33 = 55 + C, which forces C = 14.

To get the second lightest weight of 24, we must add A and C, so 24 = A + C = A + 14, which forces A = 10. Similarly for the second heaviest weight of 32, we must add E and C, so 32 = E + C = E + 14, which forces E = 18.

To finish this off, A + B = 22 forces B = 12, and D + E = 33 forces D = 15.

So the weights in order are: 10, 12, 14, 15, and 18.

These steps will work for any set of five weights.