

Bill Carey¹

Bill Carey is planning to run in the annual ASU Pi Day 5k Run. To get stronger and fitter to be able to run in the event, Bill has decided to start taking protein shakes to gain lean muscle mass. Bill is trying to decide between two protein powders to help him increase muscle mass. For the first protein powder (chocolate flavor), one scoop weighs 37 grams, contains 120 calories and 5 grams of protein. For the second protein powder (vanilla flavor), one scoop contains 65 grams, 160 calories and 10 grams of protein. However, Bill has decided he wants no more than 450 calories and 25 grams of protein for his protein shakes during the day. He does, however, need at least 120 grams of powder per day to help him gain muscle.

Having sampled the two protein powders, he also assigned a “taste rating” to each gram of powder, where 0 is the lowest, and 100 is the highest. He rates the chocolate-flavored protein powder a 95, and he rates the vanilla powder 85 (he likes chocolate more than vanilla). Because he found a good deal, he wants to buy both and use them together for his diet plan.

Find the optimum plan that stays within Bill’s constraints and maximizes the total taste rating of his protein shakes.

¹ This exercise problem and related solutions were originally developed by Athira Praveen based on Practical Management Science 5th Edition. This current revision was revised by Nowed Patwary.