**Case Problem 2: Production Strategy**

1. Let *BP*100 = the number of BodyPlus 100 machines produced

*BP*200 = the number of BodyPlus 200 machines produced

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Max | 371*BP*100 | + | 461*BP*200 |  |  |  |
| s.t. |  |  |  |  |  |  |
|  | 8*BP*100 | + | 12*BP*200 |  | 600 | Machining and Welding |
|  | 5*BP*100 | + | 10*BP*200 |  | 450 | Painting and Finishing |
|  | 2*BP*100 | + | 2*BP*200 |  | 140 | Assembly, Test, and Packaging |
|  | -0.25*BP*100 | + | 0.75*BP*200 |  | 0 | BodyPlus 200 Requirement |

*BP*100, *BP*200  0



Optimal solution: *BP*100 = 50, *BP*200 = 50/3, profit = $26,233.33. Note: If the optimal solution is rounded to *BP*100 = 50, *BP*200 = 16.67, the value of the optimal solution will differ from the value shown. The value we show for the optimal solution is the same as the value that will be obtained if the problem is solved using a linear programming software package such as Excel Solver.

2. In the short run the requirement reduces profits. For instance, if the requirement were reduced to at least 24% of total production, the new optimal solution is *BP*100 = 1425/28, *BP*200 = 225/14, with a total profit of $26,290.18; thus, total profits would increase by $56.85. Note: If the optimal solution is rounded to *BP*100 = 50.89, *BP*200 = 16.07, the value of the optimal solution will differ from the value shown. The value we show for the optimal solution is the same as the value that will be obtained if the problem is solved using a linear programming software package such as Excel Solver.

1. If management really believes that the BodyPlus 200 can help position BFI as one of the leader's in high-end exercise equipment, the constraint requiring that the number of units of the BodyPlus 200 produced be at least 25% of total production should not be changed. Since the optimal solution uses all of the available machining and welding time, management should try to obtain additional hours of this resource.