



Problem of the Week

Problem B and Solution

On-Base Percentage

Problem

In baseball, OBP stands for On-Base Percentage. It is the number of times the player makes it on base divided by the total number of times they step up to bat, rounded to three decimal places.

Similarly, RBI stands for Runs Batted In. It is the total number of runs that have been scored so far this season because of the player's hits.



For 15 players in MLB, suppose that we have the following OBP and RBI data.

Player	OBP	RBI
V. Guerrero	0.500	12
S. Ohtani	0.333	11
C. Raleigh	0.407	8
M. Busch	0.387	4
T. Hernandez	0.275	11

Player	OBP	RBI
A. Kirk	0.316	10
J. Rodriguez	0.309	9
G. Springer	0.339	9
A. Barger	0.378	8
J. Naylor	0.392	5

Player	OBP	RBI
J. Polanco	0.269	8
S. Suzuki	0.250	5
E. Suarez	0.275	8
D. Varsho	0.296	10
K. Carpenter	0.410	6

- (a) Order the 15 players from most likely to get on base to least likely to get on base.
Remember that the closer their OBP is to one, the more likely they are to get on base.
- (b) Max Muncy was a Dodgers player in 2025 whose OBP is between those of Julio Rodriguez and George Springer. If we know that Max's OBP includes the digit 4, what are three on-base percentages that he could have? What is one OBP that you know he cannot have? Explain how you know.
- (c) To get a run, a player must run through all four bases. Suppose your batting line-up consists of the following players: Vladimir Guerrero, Michael Busch, Teoscar Hernandez, Seiya Suzuki, Daulton Varsho, Shohei Ohtani, and Kerry Carpenter. What batting order would maximize the likelihood of getting a run within the first five hitters? Explain your thinking.



Solution

- (a) In order from most likely to get on base to least likely to get on base, the players are V. Guerrero (0.500), K. Carpenter (0.410), C. Raleigh (0.407), J. Naylor (0.392), M. Busch (0.387), A. Barger (0.378), G. Springer (0.339), S. Ohtani (0.333), A. Kirk (0.316), J. Rodriguez (0.309), D. Varsho (0.296), T. Hernandez and E. Suarez (0.275), J. Polanco (0.269), and S. Suzuki (0.250).
- (b) Max Muncy's OBP is between those of Julio Rodriguez (0.309) and George Springer (0.339). If Max's OBP includes the digit 4, three OBPs that he could have are 0.314, 0.324, and 0.334. Two OBPs that he could not have are 0.304 and 0.340. In general, Max could not have an OBP less than 0.309 or greater than 0.339.
- (c) To get a run within the first five hitters, you need to get a runner on base and then advance the runner through the remaining three bases. Thus to maximize the likelihood of this happening, you would want your first two or three hitters to have high OBPs, and the next two or three to have high RBIs. So a suitable order might be Guerrero (0.500), followed by Carpenter (0.410) and Busch (0.387), then Hernandez (11) and Ohtani (11). Other sensible orders are possible. Note that Guerrero is strong in both ways.