Question-2.R

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library(lpSolve)  
  
# Define the objective function coefficients  
obj <- c(55, 45)  
  
# Define the constraint matrix  
const <- matrix(c(8, 6, 2.5, 3), nrow = 2, byrow = TRUE)  
  
# Define the right-hand side of the constraints  
rhs <- c(400, 150)  
  
# Define the direction of the constraints  
dir <- c("<=", "<=")  
  
# Set the type of problem as maximization  
max <- TRUE  
  
# Solve the linear programming model  
solution <- lp("max", obj, const, dir, rhs, all.int = TRUE)  
  
# Print the optimal solution  
cat("Number of litres of Chardonnay wine to be produced each week: ", solution$solution[1], "\n")

## Number of litres of Chardonnay wine to be produced each week: 35

cat("Number of litres of Blanc de Blancs champagne to be produced each week: ", solution$solution[2], "\n")

## Number of litres of Blanc de Blancs champagne to be produced each week: 20

cat("Maximum Revenue: $", solution$objval, "\n")

## Maximum Revenue: $ 2825

# Define the new right-hand side of the Chardonnay grapes constraint  
rhs[1] <- 500  
  
# Solve the linear programming model  
solution <- lp("max", obj, const, dir, rhs, all.int = TRUE)  
  
# Print the optimal solution  
cat("Number of litres of Chardonnay wine to be produced each week: ", solution$solution[1], "\n")

## Number of litres of Chardonnay wine to be produced each week: 60

cat("Number of litres of Blanc de Blancs champagne to be produced each week: ", solution$solution[2], "\n")

## Number of litres of Blanc de Blancs champagne to be produced each week: 0

cat("Maximum Revenue: $", solution$objval, "\n")

## Maximum Revenue: $ 3300

# Define the new objective function coefficients  
obj[2] <- 30  
  
# Solve the linear programming model  
solution <- lp("max", obj, const, dir, rhs, all.int = TRUE)  
  
# Print the optimal solution  
cat("Number of litres of Chardonnay wine to be produced each week: ", solution$solution[1], "\n")

## Number of litres of Chardonnay wine to be produced each week: 60

cat("Number of litres of Blanc de Blancs champagne to be produced each week: ", solution$solution[2], "\n")

## Number of litres of Blanc de Blancs champagne to be produced each week: 0

cat("Maximum Revenue: $", solution$objval, "\n")

## Maximum Revenue: $ 3300