Problem of the Month
Problem 3: December 2022

Hint

(a) If the red marbles are all removed from the bag first, then what is the colour of the last marble to be removed from the bag?

(b) As in part (a), it is useful to think about the colour of the final marble to be removed. In part (a), the final colour alone determines which colour has completely removed first. In this part, it is a bit more complicated.

(c) Try to find a general expression for each of $p(r)$, $p(b)$, and $p(g)$, simplifying as much as possible. Once you have done this, try to determine the sign of $p(r) - p(b)$.

(d) One way to approach this is to compute the probabilities directly in terms of the proportions. Thinking about which colour is removed last will likely be helpful, as in earlier parts. Another approach is to use a general formula for the probabilities in terms of r, b, and g, and divide the numerator and denominator by $(r + b + g)^2$.