

**PROBLEM OF THE MONTH — APRIL 2023**

**DUE ON MAY 15, 2023 !**

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Tom has a biased die and also a biased coin. (Biased means that the different sides do not all have the same probability to show after a toss.)

On one side of the coin one red dot is painted, and on the other side two red dots; this way Tom created a “two-sided die.” The dots on the die are blue.

The expected value of the number of dots after one toss is the same for the die and for the coin.

Tom will now toss both simultaneously.

Susan offers a wager: she wins if there are more red dots than blue ones; Tom wins if there are more blue dots than red ones. (If they are equal, then no-one wins.)

Prove that the probability that Susan wins is larger than the probability that Tom wins.

Good luck!