

Suppose you flip a fair coin six times. Let  $X$  be the number of Heads you get, and let  $Y$  be the number of Tails minus the number of Heads. What is the probability that  $X = Y$  ?

- (a)  $15/64$
- (b)  $15/32$
- (c)  $15/16$
- (d)  $15/128$
- (e)  $5/64$
- (f)  $3/64$
- (g)  $1/2$
- (h)  $1/3$
- (i)  $1/15$
- (j) None of these

Suppose you flip a fair coin two times. Let  $X$  be the number of Heads you get and let  $Y = 2 - X$ . Which of the following is correct?

- (a)  $X$  and  $Y$  have the same probability mass functions.
- (b)  $Y$  does not have a probability mass function.
- (c)  $Y$  is not a random variable.
- (d)  $X$  is not a random variable.
- (e) The probability that  $X = Y$  is zero.
- (f) The probability that  $XY = 0$  is zero.
- (g) The probability that  $X + Y = 2$  is one half.
- (h)  $X$  and  $Y$  are the same random variable.
- (i)  $X$  and  $Y$  are events.
- (j)  $Y$  is always larger than  $X$ .
- (k) None of these

You have two fair dice, one red and the other blue, and each has the integers from 1 to 100, instead of the usual 1 to 6. Suppose you roll each die once. Let  $R$  and  $B$  be the numbers shown on the red and blue dice, respectively. What is the probability that  $R > B$  ?

- (a)  $99/200$
- (b)  $99/100$
- (c)  $99/400$
- (d)  $1/2$
- (e)  $9/10$
- (f)  $2/5$
- (g)  $49/100$
- (h)  $51/100$
- (i)  $0$
- (j) None of these