Probability

Random experiment:

There are two things to remember for a random experiment

1) More than one outcome
2) No prediction can be done

Example: Roll of a dice

Outcome $\{1,2,3,4,5,6\}$ → More than one

No predictation can be done, because we don't know what value will come after dice roll.

Sample Space:

→ Rolling a dice $\{1,2,3,4,5,6\}$ Sample space

→ Tossing a coin $\{H,T\}$ Sample space (2^1)

→ Tossing 2 coins $\{HH, HT, TH, TT\}$ Sample space (2^2)

→ Tossing 3 coins → There would be (2^3) possibilities

for n coins 2^n possibilities
which together called sample space.

for n dice 6^n possibilities
which would be the sample space.

Question - 1

→ Sample space for rolling a dice and tossing a coin

- Sample space for dice = $6^1 = 6$
- Sample " " coin = $2^1 = 2$

Both of their sample would have $(6 \times 2) = 12$ possibilities

→ {(H,1), (H,2) ... (H,6), (T,1), (T,2), ... (T,6)}

Question - 2

→ Sample space for tossing a coin and rolling a dice if coin has shown head. (H)

Sample space for dice = $6^1 = 6$

Sample " " coin = $2^1 = 2$

As coin can have both the possibilities but dice only can be rolled if coin shows head, Sample space would be →

{(H,1), (H,2), (H,3), (H,4), (H,5), (H,6) {T}}

Question - 3

→ Two boys and two girls are in room x. 1 boy and 3 girls are in room y. Specify the sample space in which a room is selected the a specific person.

Let for room x: B_1, B_2 (Boys)

G_1, G_2 (Girls)

for room y: B_3 (Boy)

G_3, G_4, G_5 (Girls)

Sample space for x → $\{(x,B_1), (x,B_2), (x,G_1), (x,G_2)\}$

Sample space for y → $\{(y,B_3), (y,G_3), (y,G_4), (y,G_5)\}$

Total sample space would be → x+y posibilities

$\{(x,B_1), (x,B_2), (x,G_1), (x,G_2), (y,B_3), (y,G_3), (y,G_4), (y,G_5)\}$

→ ~~There~~ Question - 5

There are 3 different colon dice → Red, blue, black

They are put into a bag. Make the sample space for taking a specific colon of dice and rolling it.

There are 3 different colons and every dice has {1,2,3,4,5,6} Numbers

So Sample space would be 3 X 6 = 18 possibilities

{(Red,1) .... (Red,6), (Blue,1) .... (Blue,6), (Black,1) .... (Black 6)}

→ Question - 6:

If a family have two children. Create the sample space for the number of girls.

Sample space for ~~eb~~ 2 children in the family → {(B,B), (B,G), (G,B), (G,G)}

Sample space for the number of girls → {0,1,2}