Question # 1

Since $P(A)=\dfrac{5}{7}$

And $P(B)=\dfrac{7}{9}$

Then the probability that both will alive 15 year is

$P(A\cap B)=P(A)\cdot P(B)=\dfrac{5}{7}\cdot\dfrac{7}{9}=\dfrac{5}{9}$ *Answer*

Question # 2

When a die is rolled then possible outcomes are

1, 2 ,3 , 4, 5, 6

This shows that possible outcomes = $n(S)=6$

Since E_1 is the event that the dots on the die are even then favourable outcomes are 2, 4, 6

this shows $n(E_1)=3$

so probability = $P(E_1) = \dfrac{n(E_1)}{n(S)} = \dfrac{3}{6} = \dfrac{1}{2}$

Now since E_2 is the event that the dot appear are more than four then favourable outcomes are 5 and 6. This show $n(E_2) = 2$

So probability = $P(E_2) = \dfrac{n(E_2)}{n(S)} = \dfrac{2}{6} = \dfrac{1}{3}$

Since E_1 and E_2 are not mutually exclusive

And the possible common outcome is 6 i.e. $n(E_1\cap E_2) = 1$

So probability $P(E_1\cap E_2)=\dfrac{n(E_1\cap E_2)}{n(S)}=\dfrac{1}{6}$ ……….. (i)

Now $P(E_1)\cdot P(E_2) = \dfrac{1}{2}\cdot\dfrac{1}{3} = \dfrac{1}{6}$ ………… (ii)

Form (i) and (ii)

$P(E_1\cap E_2) = P(E_1)\cdot P(E_2)$ Proved.

Question # 3

When two coins are tossed then possible outcomes are

HH, HT, TH, TT

i.e. $n(S)=4$

Let A be the event of getting two heads then favourable outcome is HH.

so $n(A)=1$

Now probability = $P(A)=\dfrac{n(A)}{n(S)}=\dfrac{1}{4}$ *Answer*

Question # 4

When the two coins are tossed then possible outcomes are

HH, HT, TH, TT

This shows $n(S)=4$

Let A be the event that head appear in the first toss then favourable outcomes are HT, HH, i.e. $n(A)=2$

Let B be the event that same face appear on the second toss then favourable outcomes are HH, TT. i.e. $n(B)=2$

Now probability = $P(A\cap B)=P(A)\cdot P(B)$

$$=\frac{n(A)}{n(S)}\cdot\frac{n(B)}{n(S)}=\frac{2}{4}\cdot\frac{2}{4}=\frac{1}{2}\cdot\frac{1}{2}=\frac{1}{4}$$ *Answer*

Question # 5

Since there are 52 cards in the deck therefore $n(S)=52$

Let A be the event that first card is an ace then $n(A)=4$

And let B be the event that the second card is also an ace then $n(B)=4$

Now probability = $P(A\cap B)=P(A)\cdot P(B)$

$$=\frac{n(A)}{n(S)}\cdot\frac{n(B)}{n(S)}=\frac{4}{52}\cdot\frac{4}{52}=\frac{1}{169}$$ *Answer*

Question # 6

Since there are 52 cards in the deck therefore $n(S)=52$

(i) Let A be the event that the first card is king then $n(A)=4$

and let B be the event that the second card is queen then $n(B)=4$

Now probability = $P(A\cap B)=P(A)\cdot P(B)$

$$=\frac{n(A)}{n(S)}\cdot\frac{n(B)}{n(S)}=\frac{4}{52}\cdot\frac{4}{52}=\frac{1}{169}$$ *Answer*

(ii) Let C be the event that first card is faced card.

Since there are 12 faced card in the deck therefore $n(C)=12$

and let D be the event that the second card is also faced card then $n(D)=12$

Now probability = $P(A\cap B)=P(A)\cdot P(B)$

$$=\frac{n(A)}{n(S)}\cdot\frac{n(B)}{n(S)}=\frac{12}{52}\cdot\frac{12}{52}=\frac{3}{13}\cdot\frac{3}{13}=\frac{9}{169}$$ *Answer*

Question # 7

When the two dice are thrown the possible outcomes are

(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)	(2, 6)
(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)
(4, 1)	(4, 2)	(4, 3)	(4, 4)	(4, 5)	(4, 6)
(5, 1)	(5, 2)	(5, 3)	(5, 4)	(5, 5)	(5, 6)
(6, 1)	(6, 2)	(6, 3)	(6, 4)	(6, 5)	(6, 6)

Which shows that $n(S)=36$

Let A be the event that the sum of dots in first throw is 7 then favourable outcomes are (1, 6), (2, 5), (3, 4), (4, 3), (5, 2), (6, 1) i.e. $n(A)=6$

Let B be the event that the sum of dots in second throw is 11 then favourable outcomes are (5, 6), (6, 5) i.e. $n(B)=2$

Now probability = $P(A\cap B)=P(A)\cdot P(B)$

$$=\frac{n(A)}{n(S)}\cdot\frac{n(B)}{n(S)}=\frac{6}{36}\cdot\frac{2}{36}=\frac{1}{6}\cdot\frac{1}{18}=\frac{1}{108}$$ *Answer*

Question # 8

When the two dice are thrown the possible outcomes are

(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)	(2, 6)
(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)
(4, 1)	(4, 2)	(4, 3)	(4, 4)	(4, 5)	(4, 6)
(5, 1)	(5, 2)	(5, 3)	(5, 4)	(5, 5)	(5, 6)
(6, 1)	(6, 2)	(6, 3)	(6, 4)	(6, 5)	(6, 6)

Which shows that $n(S)=36$

Let A be the event that the sum of dots in first throw is 7 then
favourable outcomes are (1, 6), (2, 5), (3, 4), (4, 3), (5, 2), (6, 1) i.e. $n(A)=6$

Let B be the event that the sum of dots in second throw is also 7 then
similarly favourable outcomes = $n(B)=6$

Now probability = $P(A\cap B)=P(A)\cdot P(B)$

$$=\frac{n(A)}{n(S)}\cdot\frac{n(B)}{n(S)}=\frac{6}{36}\cdot\frac{6}{36}=\frac{1}{6}\cdot\frac{1}{6}=\frac{1}{36}$$ *Answer*

Question # 9

When the die is thrown twice then the top may shows 1, 2, 3, 4, 5, 6
This shows possible outcomes = $n(S)=6$

Let A be the event that the number of the dots is prime then
favourable outcomes are 2, 3 ,5 , i.e. $n(A)=3$

Let B be the event that the number of dots in second throw is less than 5 then
favourable outcomes are 1 ,2 ,3 ,4 i.e. $n(B)=4$

Now probability = $P(A\cap B)=P(A)\cdot P(B)$

$$=\frac{n(A)}{n(S)}\cdot\frac{n(B)}{n(S)}=\frac{3}{6}\cdot\frac{4}{6}=\frac{1}{2}\cdot\frac{2}{3}=\frac{1}{3}$$ *Answer*

Question # 10

Since number of red balls = 8
Number of white ball = 5
Number of black ball = 7
Therefore total number of balls = 8 + 5 + 7 = 20 i.e. $n(S)=20$

Let A be the event that the first ball is red then $n(A)=8$

Let B be the event that the second ball is white then $n(B)=5$

Let C be the event that the third ball is black then $n(C)=7$

Now probability = $P(A\cap B\cap C)=P(A)\cdot P(B)\cdot P(C)$

$$=\frac{n(A)}{n(S)}\cdot\frac{n(B)}{n(S)}\cdot\frac{n(C)}{n(S)}$$

$$=\frac{8}{20}\cdot\frac{5}{20}\cdot\frac{7}{20}=\frac{2}{5}\cdot\frac{1}{4}\cdot\frac{7}{20}=\frac{14}{400}=\frac{7}{200}$$ *Answer*

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THE END