Question # 1

Sample space = $\{1,2,3,.........,9\}$ then $n(S)=9$

Since event $A=\{2,4,6,8\}$ then $n(A)=4$

Also event $B=\{1,3,5\}$ then $n(B)=3$

Now $P(A\cup B)=P(A)+P(B)=\dfrac{n(A)}{n(S)}+\dfrac{n(B)}{n(S)}=\dfrac{4}{9}+\dfrac{3}{9}=\dfrac{7}{9}$ *Answer*

Question # 2

Red marble = 10, White marble = 30, Black marble = 20
Total marble = 10 + 30 + 20 = 60
Therefore $n(S)=60$

Let A be the event that the marble is red then $n(A)=10$

And let B be the event that the marble is white then $n(B)=30$

Since A and B are mutually exclusive event therefore

Probability $=P(A\cup B)=P(A)+P(B)=\dfrac{n(A)}{n(S)}+\dfrac{n(B)}{n(S)}=\dfrac{10}{60}+\dfrac{30}{60}=\dfrac{40}{60}=\dfrac{2}{3}$

Question # 3

Since sample space is first fifty natural number so $S=\{1,2,3,.........,50\}$

Then $n(S)=50$

Let A be the event that the chosen number is a multiple of 3 then
$A=\{3,6,9,........,48\}$ so $n(A)=16$

If B be the event that the chosen number is multiple of 5 then
$B=\{5,10,15,........,50\}$ so $n(B)=10$

Now $A\cap B=\{15,30,45\}$ so $n(A\cap B)=3$

Since A and B are not mutually exclusive event therefore
Probability $=P(A\cup B)=P(A)+P(B)-P(A\cap B)$

$$=\frac{n(A)}{n(S)}+\frac{n(B)}{n(S)}-\frac{n(A\cap B)}{n(S)}$$

$$=\frac{16}{50}+\frac{10}{50}-\frac{3}{50}=\frac{16+10-3}{50}=\frac{23}{50}$$ *Answer*

Question # 4

Total number of cards $=52$,
therefore possible outcomes = $n(S)=52$

Let A be the event that the card is a diamond card.
Since there are 13 diamond card in the deck therefore $n(A)=13$

Now let B the event that the card is an ace card.
Since there are 4 ace cards in the deck therefore $n(B)=4$

Since one diamond card is also an ace card therefore A and B are not mutually exclusive event and $n(A\cap B)=1$

Now probability = $P(A\cup B)=P(A)+P(B)-P(A\cap B)$

$$=\frac{n(A)}{n(S)}+\frac{n(B)}{n(S)}-\frac{n(A\cap B)}{n(S)}$$

$$=\frac{13}{52}+\frac{4}{52}-\frac{1}{52}=\frac{13+4-1}{52}=\frac{16}{52}=\frac{4}{13}$$ *Answer*

---

3 *Question # 5*

When die is thrown twice 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)

This shows possible outcomes = $n(S)=36$

Let A be the event that the sum is 3

Then the favourable outcomes are (1, 2) and (2, 1), i.e. $n(A)=2$

Now let B the event that the sum is 11

Then the favourable outcomes are (5, 6) and (6, 5), i.e. $n(B)=2$

Since A and B are mutually exclusive events therefore

Probability = $P(A\cup B)=P(A)+P(B)$ $=\dfrac{n(A)}{n(S)}+\dfrac{n(B)}{n(S)}$ $=\dfrac{2}{36}+\dfrac{2}{36}=\dfrac{4}{36}=\dfrac{1}{9}$

---

3 *Question # 6*

Do yourself as above

---

3 *Question # 7*

When two dice are thrown the possible outcomes are

[*See the dice table of Question # 5*]

This shows possible outcomes = $n(S)=36$

Since A be the event that the sum of dots is and odd number

Then favourable outcomes are

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

i.e. favourable outcomes = $n(A)=18$

Sine B is the event that the least one die has 3 dot on it therefore favourable outcomes are (1, 3), (2, 3), (3, 1), (3, 2), (3, 3), (3, 4),(3, 5), (3, 6), (4, 3), (5, 3), (6, 3) i.e. favourable outcomes = $n(B)=11$

Since A and B have common outcome (2, 3), (3, 2), (3, 4), (3, 6), (4, 3), (6, 3)
i.e $n(A\cap B)=6$

Now probability = $P(AUB)=P(A)+P(B)-P(A\cap B)$

$$=\frac{n(A)}{n(S)}+\frac{n(B)}{n(S)}-\frac{n(A\cap B)}{n(S)}$$

$$=\frac{18}{36}+\frac{11}{36}-\frac{6}{36}=\frac{18+11-6}{36}=\frac{23}{36}\quad \textit{Answer}$$

---

3 *Question # 8*

Number of girls = 10, Number of boys = 20

Total number of students = 10 + 20 = 30

Since half of the girls and half of the boys have blue eyes

Therefore students having blue eyes = 5 + 10 = 15

Let A be event that monitor of the class is a student of blue eyes then $n(A)=15$

Now Let B be the event that the monitor of the class is girl then $n(B)=10$

Since 5 girls have blue eyes therefore A and B are not mutually exclusive

Therefore $n(A\cap B)=5$

Now probability = $P(A\cup B)=P(A)+P(B)-P(A\cap B)$

$$=\frac{n(A)}{n(S)}+\frac{n(B)}{n(S)}-\frac{n(A\cap B)}{n(S)}$$

$$=\frac{15}{30}+\frac{10}{30}-\frac{5}{30}=\frac{15+10-5}{30}=\frac{20}{30}=\frac{2}{3}\quad \textit{Answer}$$