Problem 1

Let X be the random variable number of question answered wrongly

Therefore $X \sim \text{Bin}(20, \frac{3}{4})$

Probability that a person undertaking that test has answered exactly 5 questions wrong = P(X =5)

$$= \binom{20}{5} * 0.75^5 * 0.25^{20-5}$$
$$= 0.000003426496$$

Used the following R code

```
> #Stats II Assignment II
> #
> #Problem 1
>
> #Probability that person undertaking that test has answered exactly 5 qu
estions wrong.
> pbinom(q = 5,size = 20,prob = 0.75) - pbinom(q = 4,size = 20,prob = 0.75
)
[1] 3.426496e-06
```

Problem 2

Let Y be the random variable number of "D" got when a dice is rolled.

Therefore $Y \sim \text{Bin}(50, \frac{1}{6})$

Probability of getting a "D" exactly 5 times = P(Y =5)

$$= \binom{50}{5} * \frac{1}{6}^5 * \frac{5}{6}^{50-5}$$
$$= 0.07450226$$

```
> #Problem 2
>
> #probability of getting a "D" exactly 5 times.
> pbinom(q = 5,size = 50,prob = 1/6) - pbinom(q = 4,size = 50,prob = 1/6)
[1] 0.07450226
```

Problem 3

Possible outcome are

(i) Both balls being Red with P(Both balls being Red) = $\frac{4}{10} * \frac{3}{9} = 0.133333$

(ii) Both balls being Black with P(Both balls being Black) = $\frac{6}{10} * \frac{5}{9} = 0.33333$

(iii) 1st ball being Black followed by the red ball with
P (1st ball being Black followed by the red ball) = $\frac{6}{10} * \frac{4}{9} = 0.26667$

(iv) 1st ball being Red followed by the black ball with
P (1st ball being Black followed by the red ball) = $\frac{4}{10} * \frac{6}{9} = 0.26667$

```
#Problem 3
```

```
> #P(Both balls being Red)
> (4/10)*(3/9)
[1] 0.1333333
> #P(Both balls being Black)
> (6/10)*(5/9)
[1] 0.3333333
> #Probablity different colour
> (6/10)*(4/9)
[1] 0.2666667


>
```