

## Question - 1

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We have to find the probability that exactly one gets his own watch

Man A should get watch A

Man B should get watch B

Man C should get watch C

Man D should get watch D

There will be 8 combinations for exact one watch

$w_a$   $w_d$   $w_b$   $w_c$

$w_a$   $w_c$   $w_d$   $w_b$

$w_d$   $w_b$   $w_a$   $w_c$

$w_c$   $w_b$   $w_d$   $w_a$

$w_b$   $w_d$   $w_c$   $w_a$

$w_d$   $w_a$   $w_c$   $w_b$

$w_b$   $w_c$   $w_a$   $w_d$

$w_c$   $w_a$   $w_b$   $w_d$

Total there are 24 combination possible

$$\text{Possibility of exactly one} = \frac{8}{24} = \frac{1}{3}$$

## Sample space :-

### 1st six combinations :-

wa wb wc wd

wa wb wd wc

wa wc wb wd

wa wc wd wb

wa wd wb wc

wa wd wc wb

### 2nd six combinations :

wb wa wc wd

wb wa wd wc

wb wc wa wd

wb wc wd wa

wb wd wa wc

wb wd wc wa

### 3rd six combinations :

wc wa wb wd

wc wa wd wb

wc wb wa wd

wc wb wd wa

wc wd wa wb

wc wd wb wa

#### 4th six combinations:-

wd	wa	wb	we
wd	wa	we	wb
wd	wb	wa	we
wd	wb	we	wa
wd	we	wa	wb
wd	we	wb	wa

## Question - 2

$$P(A) = 0.6, \quad P(A \cup B) = 0.9$$

a)  $P(B)$  if  $A$  &  $B$  are independent

$$P(A \cup B) = P(A) + P(B) - (P(A) \times P(B))$$

$$0.9 = 0.6 + P(B) - 0.6(P(B))$$

$$0.3 = 0.4 \times P(B)$$

$$P(B) = 0.75$$

b)  $P(B)$  if  $A$  &  $B$  are mutually exclusive

$$P(A \cup B) = P(A) + P(B)$$

$$0.9 = 0.6 + P(B)$$

$$P(B) = 0.3$$

c) Find  $P(B)$  if  $P(A|B) = 0.5$

As we know

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

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

$$P(A|B) = \frac{P(A) + P(B) - P(A \cup B)}{P(B)}$$

$$P(B) \neq P(B)$$

$$P(B) = \frac{0.6 + P(B) - 0.9}{0.5}$$

$$0.5 P(B) = -0.3 + P(B)$$

$$-0.5 P(B) = -0.3$$

$$P(B) = 0.6$$