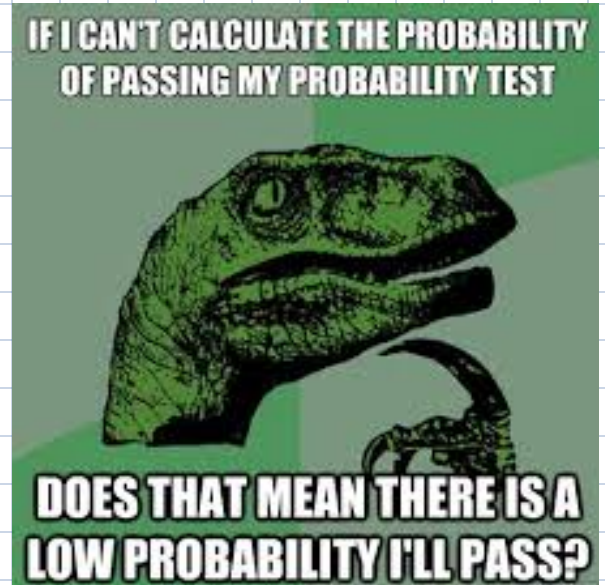
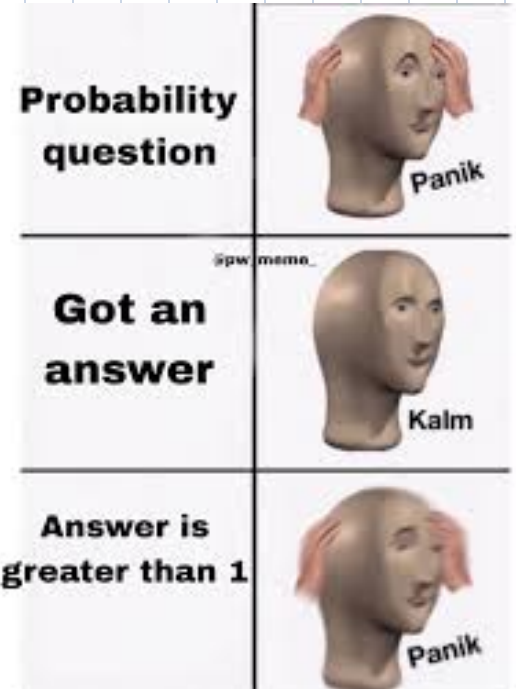
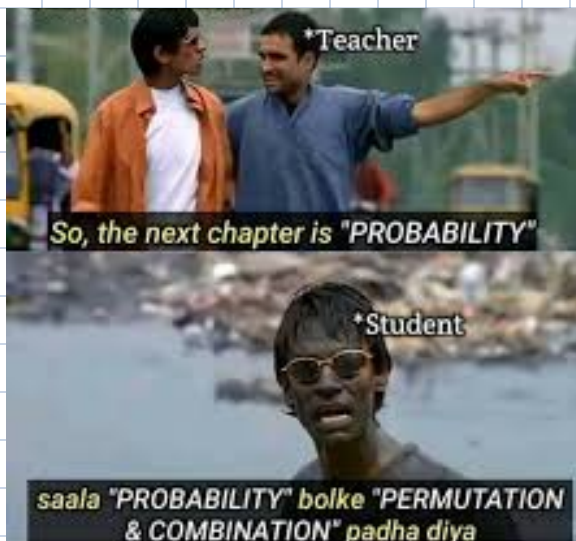


Agenda

Yesterday I saw A book called 'How to solve 50% of your problems" So I bought two books.



Questions

Class of 50 Students

30 \rightarrow Basketball

$P(A)$

20 \rightarrow Football

$P(B)$

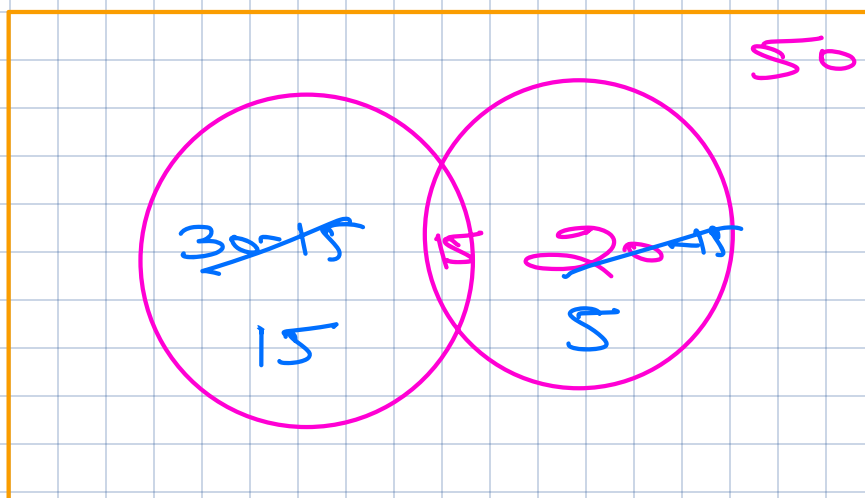
15 \rightarrow Both B and F $\Rightarrow P(A \cap B)$

- ① How many students Don't play any sport
- ② What is probability of picking a student that play B or F

Sol ① $P(A \cup B) \leftarrow A \text{ or } B$

15

②



50/35

Questions

Question 2:

Two events A and B are such that:

- $P(A) = 0.5$
- $P(B) = 0.4$
- $P(A \cap B) = 0$ ↑↑ actually Exclusive

Which of the following is TRUE?

Options:

- A. A and B are independent ~~X~~
- B. A and B are mutually exclusive ✓
- C. A and B are exhaustive X
- D. $P(A \cup B) = 0.1$ X

$$P(A \cap B) = 0.5 \times 0.4 = 0.2 \neq 0$$
$$P(A \cap B) \neq P(A) \times P(B)$$

$$P(A \cup B) = 1$$
$$P(A) + P(B) + P(A \cap B)$$
$$0.5 + 0.4 + 0 = 0.9 \neq 1$$

Dice
Getting 1 is $\frac{1}{6}$

Coin
 $\frac{1}{2}$

$$P(D \cap H) = \frac{1}{6} \times \frac{1}{2}$$

Question 3:

Context: In a startup, 60% of employees are developers and the rest are marketers.

20% of the developers and 50% of the marketers work remotely.

An employee is selected at random and is found to be working remotely.

What is the probability that the person is a developer?

Options:

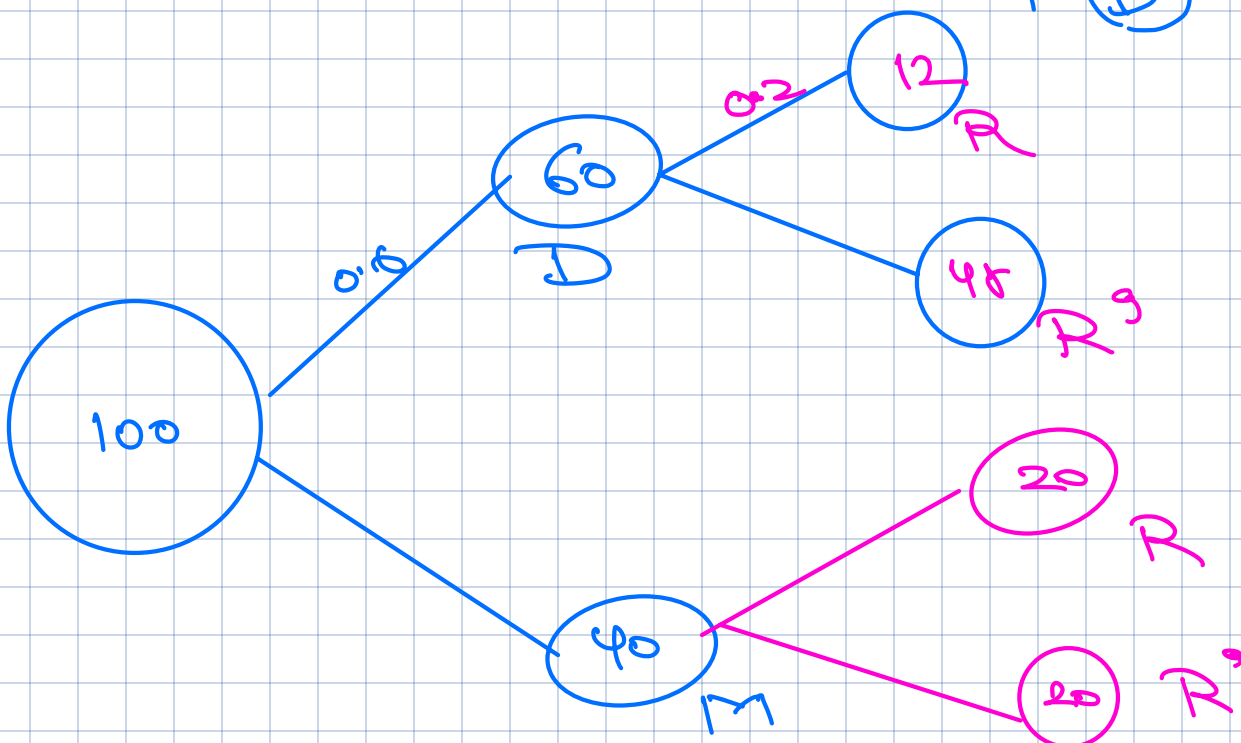
- A. 0.24
- B. 0.375
- C. 0.6
- D. 0.45

① Law of Total P

$$P_R = P_{R \text{ given } D} \times P(D) + P_{R \text{ given } D^c} \times P(D^c)$$

② Bayes's Theorem

$$P(D|R) = \frac{P(D|R) \times P(R)}{P(D)}$$



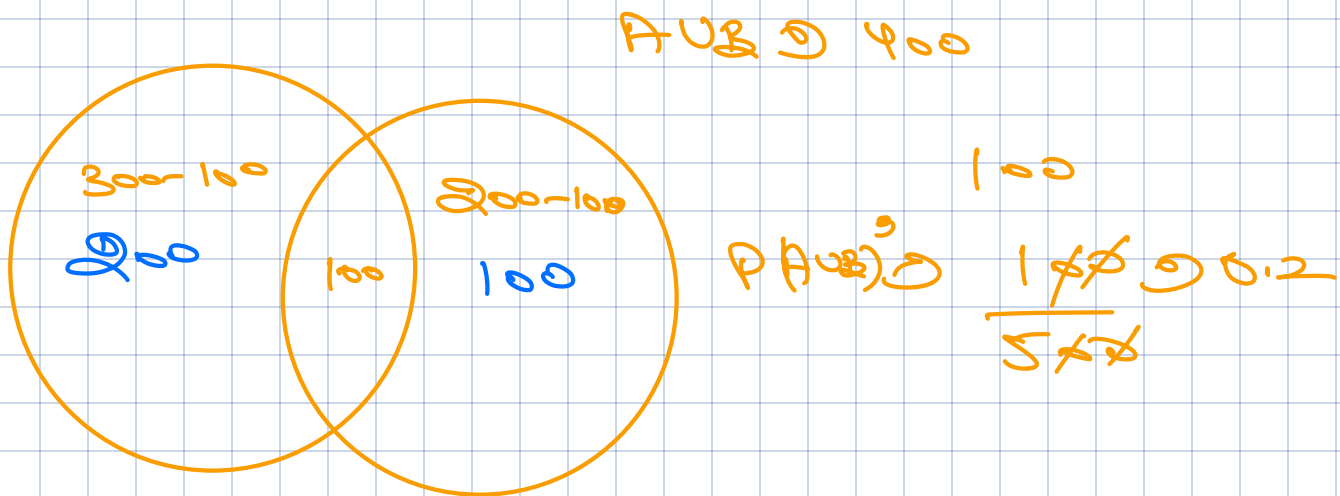
$$P(D/R) = \frac{12}{32} = 0.375$$

Question 4:

Context: A hospital collects data on 500 patients.
Of them:

- 300 had a fever
- 200 had a cough
- 100 had both fever and cough

If a patient is selected at random, what is the probability that the patient has neither fever nor cough?



Question 6:

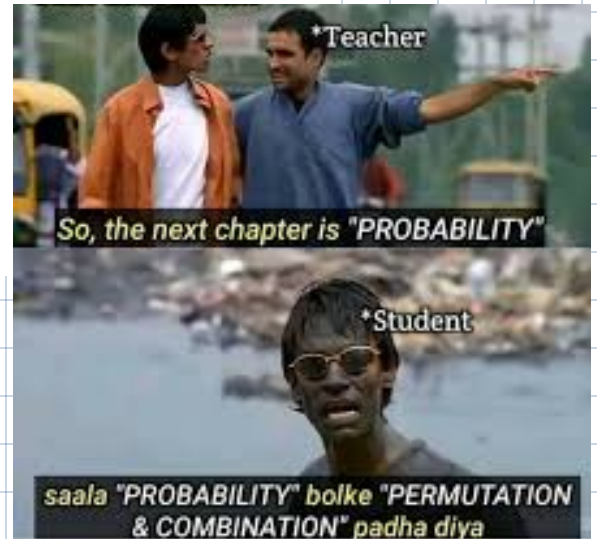
A company has 8 developers (5 men and 3 women). It wants to form a 4-member tech committee such that:

- At least 2 women are included
- Two women (W1 and W2) refuse to work together

How many valid committees can be formed?

Options:

- A) 25
- B) 40
- C) 50
- D) 60



2 women from 3 \downarrow 3C_2 * 5C_2 ①
 3 women from 3 \downarrow 3C_3 * 5C_1
 * With Constraint $\rightarrow w_1, w_2$ X
 2 Women

w_1 and w_2 X

Pick 2 w out of 5

w_1, w_3 or w_2, w_3 or w_1, w_2

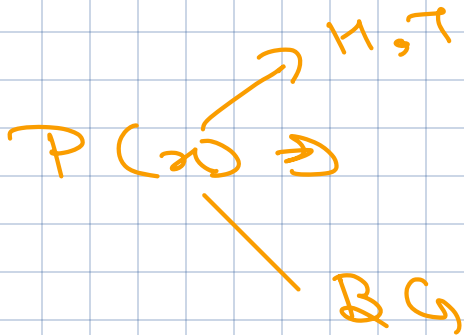
2 women \rightarrow 2 * 5C_2

men \downarrow 5C_2
 ~~3C_2~~ * 5C_1
 2

3 women \rightarrow 3 * 5C_1 ①
 w_1, w_2, w_3 X Constraint
~~1 way~~

Ans 3 Qo

$$S \subset \mathbb{Z} \quad \frac{5!}{(5-2)! \times 2!} = \frac{5 \times 4 \times 3}{2! \times 2!} = 10$$



$n \longrightarrow$ Exactly k Successes

$$P(X=k) = C_k^n (p)^k (1-p)^{n-k}$$

Question 7:

A student appeared for four subjects with the following marks and credit weights:

| Subject | Marks | Credits |
|---------|-------|---------|
| Math | 80 | 4 |
| Physics | 70 | 3 |
| Chem | 90 | 2 |
| Bio | 60 | 1 |

9 80

Due to a policy change, Physics and Chemistry marks are counted only if they are above 75, else they contribute zero.

What is the correct weighted average?

```
marks = [80, 0, 90, 60] # boolean_mask
credits = [4, 0, 2, 1]
```

```
weighed_avg = 0
sum_credit = 0
for m, c in zip(marks, credits):
    weighed_avg += m * c
    sum_credit += c
```

```
weighed_avg = weighed_avg/sum_credit
print(weighed_avg)
```

80.0

Question 8:

A logistics company recorded delivery durations (in minutes) for 15 urgent parcels delivered during a snowstorm:

[25, 28, 28, 30, 33, 36, 37, 37, 100, 38, 39, 41, 44, None, 47]

Due to data loss, one value is None, and the analyst decides to drop it before computing any statistics. They want to compute the Interquartile Range (IQR) to identify unusually late deliveries (outliers).

What is the correct IQR?

Options:

- A. 12.0
- B. 9.4
- C. 6.5
- D. 9.75

Question 10:

Let X be a discrete random variable representing the number of vehicles entering a gated parking lot per hour:

- $P(X = 0) = 0.1$,
- $P(X = 1) = 0.2$,
- $P(X = 2) = 0.3$,
- $P(X = 3) = 0.4$

What's the expected number of vehicles, and is this variable discrete or continuous?

Options:

- A. 2.0, Continuous
- B. 2.0, Discrete
- C. 3.0, Discrete
- D. 3.0, Continuous

X Discrete $\begin{cases} 1 \\ 2 \\ 3 \\ \vdots \end{cases}$

~~Expected Value also
be always
Discrete?~~

Expected Value \Rightarrow Weighted Avg
 \downarrow
$$\sum_{i=1}^n \frac{P_i \cdot X_i}{\sum P_i = 1}$$