

Addition Rule "Or"

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

- Probability A + Probability B - Probability of both events happening
- Use when you are solving word problems or have a table

Example 1: Find the probability of A or B.

$P(A) = 0.73$, $P(B) = 0.15$, and $P(A \cap B) = 0.32$. Find $P(A \cup B)$.

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

$$0.73 + 0.15 - 0.32 = \boxed{0.56}$$

Example 2: Work backwards to find the probability of A and B.

$P(A \cup B) = 0.48$, $P(A) = 0.23$, $P(B) = 0.38$, Find $P(A \cap B)$.

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

$$0.48 = 0.23 + 0.38 - x$$

$$0.48 = 0.61 - x$$

$$-0.61 \quad -0.61$$

$$-0.13 = -x \quad \boxed{x = 0.13}$$

Example 3: 22 customers are eating dinner at an Italian restaurant. Of the 22 customers, 18 order pizza, 10 order a salad, and 8 order pizza and a salad. Find the probability that a customer orders pizza or salad.

$$P(P \cup S) = P(P) + P(S) - P(P \cap S)$$

$$\frac{18}{22} + \frac{10}{22} - \frac{8}{22} = \frac{20}{22} = \frac{10}{11}$$

Example 4: Given the following table, find the probability of picking a person that is male or drinks pop.

	Drinks Pop	Does Not Drink Pop	Total
Males	55	21	76
Females	28	30	58
Total	83	51	134

$$P(M \cup P) = P(M) + P(P) - P(M \cap P)$$

$$\frac{76}{134} + \frac{83}{134} - \frac{55}{134} = \frac{104}{134} = \frac{52}{67}$$

Example 5: Tickets are numbered 1 - 20. What is the probability of drawing an even number or multiple of 5?

2, 4, 6, 8, 10, 12, 14, 16, 18, 20
5, 10, 15, 20

$$P(E \cup M5) = P(E) + P(M5) - P(E \cap M5)$$

$$\frac{10}{20} + \frac{4}{20} - \frac{2}{20} = \frac{12}{20} = \frac{3}{5}$$