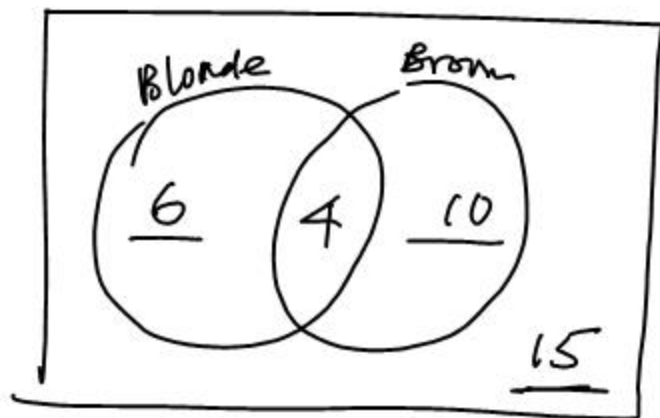


3 B #1

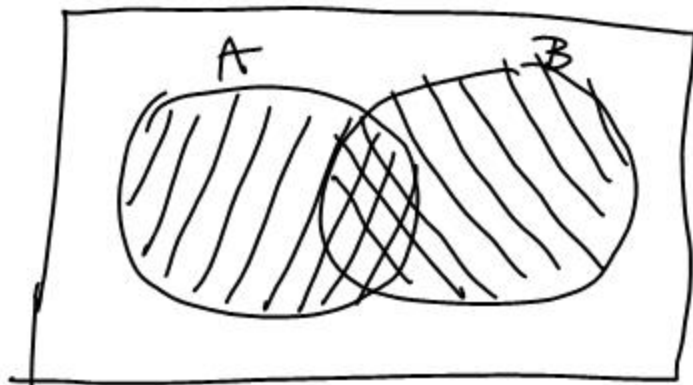
10
14



$$\begin{aligned} P(B \cup Br) &= \frac{6 + 4 + 10}{35} && \cup \text{ or} \\ &= \frac{20}{35} && \cap \text{ and} \\ &= \frac{4}{7} \end{aligned}$$

Some Probability Formulas

The Addition Rule



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

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

Complementary Events

$$P(A') = 1 - P(A)$$

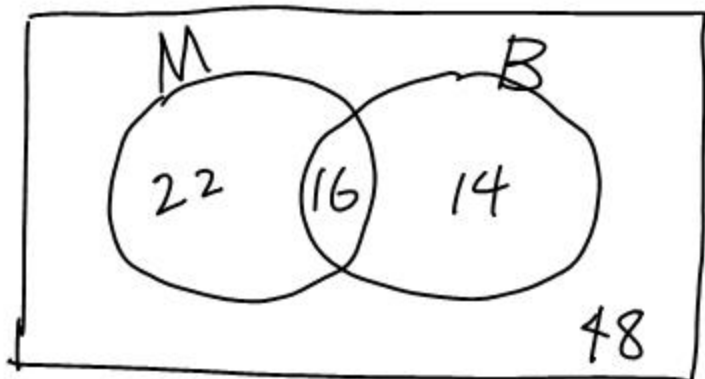
A and A' are complementary



Conditional Probability

$P(A|B)$ ← The probability that A happens given that B happens

EX.



M = students taking HL Math
B = HL Bio

Find the probability that a student is taking HL Math given that he or she takes HL Bio.

$$\frac{16}{30} = \frac{P(M \cap B)}{P(B)}$$

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

condition

$$\boxed{\text{Ex}} \quad P(\heartsuit \cup Q)$$

$$= P(\heartsuit) + P(Q) - P(\heartsuit \cap Q)$$

addition
formula

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

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

$$= \frac{4}{13}$$

$\boxed{\text{Ex}}$

$$\boxed{\text{Ex}} \quad P(A) = \frac{9}{20} \text{ and } P(B) = \frac{3}{10}$$

$$P(A \cup B) = 2P(A \cap B) \quad \leftarrow$$

(a) Find $P(A \cup B)$

(b) Find $P(A \cup B)'$

(c) Find $P(A \cap B')$

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

$$P(A \cup B) = \frac{9}{20} + \frac{3}{10} - \frac{1}{2}P(A \cup B)$$

$$\frac{1}{2}P(A \cup B) \qquad \qquad \qquad + \frac{1}{2}P(A \cup B)$$

$$\cancel{\frac{2}{3}} \cdot \cancel{\frac{3}{2}} P(A \cup B) = \frac{\cancel{3}}{\cancel{4}_2} \cdot \cancel{\frac{2}{3}}$$

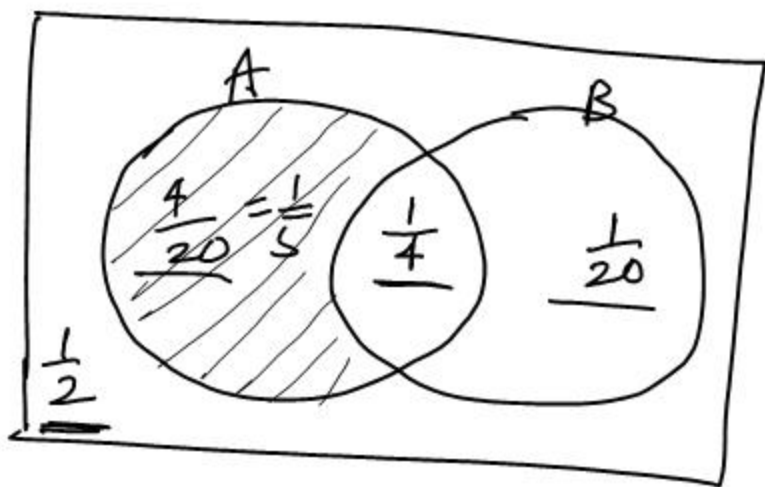
$$P(A \cup B) = \frac{1}{2}$$

$$(b) \quad P(A \cup B)' = 1 - P(A \cup B)$$

$$= 1 - \frac{1}{2}$$

$$= \frac{1}{2}$$

$$(c) P(A \cap B') = \frac{1}{5}$$



$$A: \frac{9}{20} - \frac{1}{4} = \frac{9}{20} - \frac{5}{20}$$

$$B: \frac{3}{10} - \frac{1}{4} = \frac{6}{20} - \frac{5}{20}$$

Ex Out of 53 teachers, 36 drink tea, 18 drink coffee, and 10 drink neither one.

(a) How many drink both

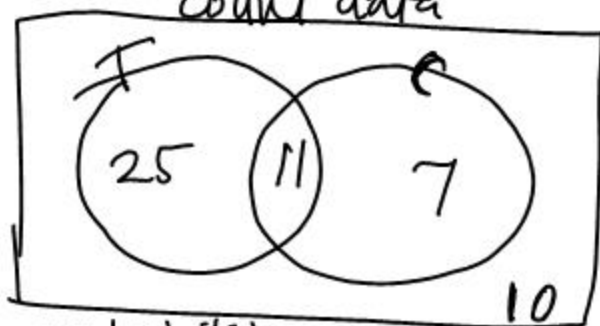
(b) Find the prob. that a teacher drinks tea but no coffee

(c) If he drinks tea, find the prob. he also drinks coffee.

$$(a) P(T \cap C) = \frac{11}{53}$$

11 teachers

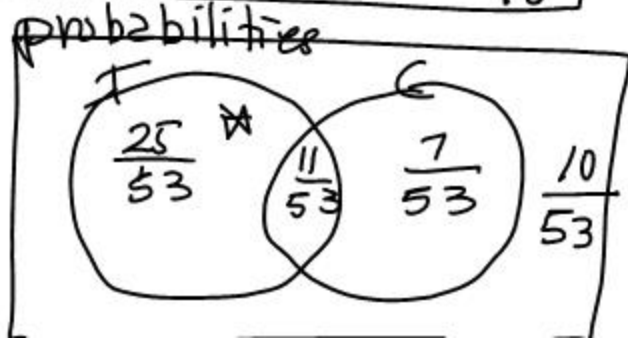
$$\begin{array}{r} 36 \\ + 18 \\ \hline 54 \\ - 43 \\ \hline 11 \end{array}$$



$$(b) P(T \cap C') = \frac{25}{53}$$

$$(c) P(C|T) = \frac{P(C \cap T)}{P(T)}$$

over



$$\frac{P(C \cap T)}{P(T)} = \frac{\frac{11}{53}}{\frac{36}{53}} = \frac{11}{36}$$

p. 87 #3. S = owns skateboard
R = owns rollerblades

$$P(S) = 0.48$$

$$P(S \cap R) = 0.39$$

$$P(R|S) = \frac{P(R \cap S)}{P(S)} = \frac{0.39}{0.48} = \frac{13}{16}$$

HW

3C

 #4, 6, 7, 8

3G

 #1, 2, 6
