

Example 3:

The probability that a person riding on a city bus is wearing headphones is 21%. The probability that a person riding on a city bus is looking at a smart phone is 58%. The probability of a person on a city bus wearing headphones and looking at a smartphone is 15%. A person on a city bus is selected at random.

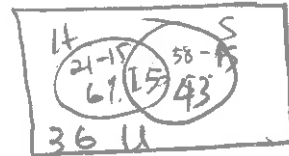
Note: You might notice that using the multiplication rule and multiplying the two individual probabilities together (the 21% and the 58%) results in a probability of 12.18%, not 15% (for the **and** probability in the question). This can happen since there may be other probabilities at play that you cannot "see" in any given question. (i.e. Someone looking at a phone is probably MORE likely to be wearing headphones than the 'random' person). Simplified, this means **TRUST THE PROBABILITIES THAT YOU ARE GIVEN IN THE QUESTION!**

a) Determine the probability that the randomly selected person is wearing headphones or looking at a smartphone.

b) Determine the probability that the randomly selected person is doing neither of these things.

$$\begin{aligned} a) P(A \text{ or } B) &= P(A) + P(B) - P(A \cap B) \\ &= 21\% + 58\% - 15\% \\ &= 64\% \end{aligned}$$

$$\begin{aligned} b) P(A \text{ or } B)^c &= 100\% - 64\% \\ &= 36\% \end{aligned}$$



A = headphones
B = smartphones

$$\begin{aligned} P(A) &= 21\% \\ P(B) &= 58\% \\ P(A \cap B) &= 15\% \end{aligned}$$

H = headphones
S = smartphones

Example 4

In a class of 32 students, there are 15 boys. 12 of the students in the class are over six feet tall. Eight of the students that are over six feet tall are boys.

a) Determine the probability that a randomly selected student will be a boy or over six feet tall.

b) How many students from this class would you expect to be a boy or over six feet tall?

$$\begin{aligned} a) P(A \text{ or } B) &= P(A) + P(B) - P(A \cap B) \\ &= \frac{15}{32} + \frac{12}{32} - \frac{8}{32} = \frac{19}{32} \end{aligned}$$

b)

$$\begin{aligned} 32 - 7 - 8 - 4 \\ = \underline{13} \end{aligned}$$

