

Additional Rule 2: When two events, A and B, are non-mutually exclusive, the probability that A or B will occur is:

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

In the rule above, P(A and B) refers to the overlap of the two events. Let's apply this rule to some other experiments.

Experiment 5: In a math class of 30 students, 17 are boys and 13 are girls. On a unit test, 4 boys and 5 girls made an A grade. If a student is chosen at random from the class, what is the probability of choosing a girl or an A student?



Probabilities: $P(\text{girl or A}) = P(\text{girl}) + P(A) - P(\text{girl and A})$

$$= \frac{13}{30} + \frac{9}{30} - \frac{5}{30}$$

$$= \frac{17}{30}$$



Example1: what is the probability to select a piece that is round or orange?

$$P(\text{round or orange}) = P(\text{round}) + P(\text{orange}) - P(\text{round and orange})$$

$$= \underline{\hspace{2cm}} + \underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

Example 2: a dice is rolled, what is the probability to roll a multiple of 3 or an even number?

$$P(\text{multiple of 3 or even}) = P(\text{multiple of 3}) + P(\text{even}) - P(\text{multiple of 3 and even})$$

$$= \underline{\hspace{2cm}} + \underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

Example3: in a group of graduate students total of 8 students, 5 of which are females and the remaining 3 are males. There are 4 international girls and 2 international males.

Find the probability of selecting a male or an international student.

$$P(\text{male or international}) = P(\text{male}) + P(\text{international}) - P(\text{male and international})$$

$$= \underline{\hspace{2cm}} + \underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$