

## 12.4 Compound Events

One card is drawn from the deck. Find each probability.

1) selecting a two  $= \frac{4}{52} = \boxed{\frac{1}{13}}$

2) selecting a face card J Q K

$$\frac{12}{52} = \boxed{\frac{3}{13}}$$

A survey was given to 1800 high school students. Of those 1800 students, 450 participated in a high school activity. Find each probability.

1) participating in an activity  $\frac{450}{1800} = \frac{1}{4}$

2) not participating in an activity

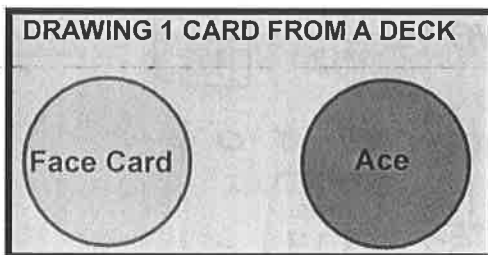
$$1 - \frac{450}{1800}$$

$$\frac{1800}{1800} - \frac{450}{1800} = \frac{1350}{1800} = \frac{3}{4}$$

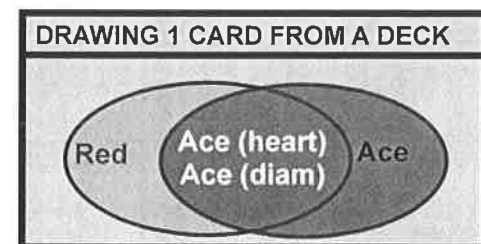
**Single Event:** Describes a single outcome

**Compound Event:** Made up of 2 or more single events

**Mutually Exclusive Events (disjoint):** Events that cannot both occur in the same trial of an experiment



**Inclusive Events (overlapping):** Events have 1 or more outcomes in common

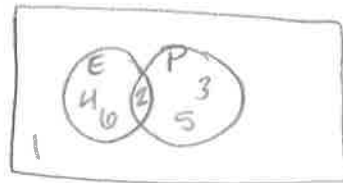


A six-sided die is rolled. Draw a Venn diagram that relates the two events. Then decide whether the events are disjoint or overlapping.

1. Event A: The result is an even number.

Event B: The result is a prime number.

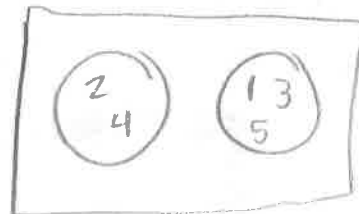
overlapping



2. Event A: The result is 2 or 4.

Event B: The result is an odd number.

disjoint



Adding ("or") 1 draw	no overlap $P(\text{blue or red})$	overlap $P(\text{adult female})$ $P(a) + P(f) - (a/f)$
Multiply ("and") 2+ draws	w/ replacement	w/o replacement

A group of students are donating blood during a blood drive. A student has a  $\frac{9}{20}$  probability of having type O blood and a  $\frac{2}{5}$  probability of having type A blood.

What is the probability that a student has type O or type A blood? *add*  
*no overlap*

$P(\text{type O or type A})$

$$\frac{9}{20} + \frac{2}{5} = \frac{17}{20} = .85 = 85\%$$

Each student cast one vote for senior class president. Of the students, 25% voted for Hunt, 20% for Kline, and 55% for Vila.

If a student from the senior class is selected at random, what is the probability that the student voted for Kline or Vila?

*add*  
*no overlap*

$$20 + 55 = 75\%$$

Find the probability on a number cube of rolling a 4 or an even number

add  
overlap

$$\begin{aligned}P(4 \text{ or even}) &= P(4) + P(\text{even}) - P(\text{overlap}) \\&= \frac{1}{6} + \frac{3}{6} - \frac{1}{6} \\&= \frac{3}{6} \\&= \boxed{\frac{1}{2}}\end{aligned}$$

Find the probability on a number cube of rolling an odd number or a number greater than 2

add  
overlap

$$\begin{aligned}P(\text{odd or } > 2) &= P(\text{odd}) + P(> 2) - P(\text{overlap}) \\&= \frac{3}{6} + \frac{4}{6} - \frac{2}{6} \\&= \boxed{\frac{5}{6}}\end{aligned}$$

A card is drawn from a deck of 52. Find the probability of drawing a red card (hearts or diamonds) or a face card (jack, queen, or king).

add  
overlap

$$\begin{aligned}
 P(\text{red or face}) &= P(\text{red}) + P(\text{face}) - P(\text{red face}) \\
 &= \frac{26}{52} + \frac{12}{52} - \frac{6}{52} \\
 &= \frac{32}{52}
 \end{aligned}$$

$$= \frac{8}{13}$$

1. A card is randomly selected from a standard deck of 52 playing cards. What is the probability that it is a 10 or a face card?

$$\begin{aligned}
 P(10 \text{ or face}) &= P(10) + P(\text{face}) \quad \text{add no overlap} \\
 &= \frac{4}{52} + \frac{12}{52} = \frac{16}{52} = \frac{4}{13}
 \end{aligned}$$

2. A card is randomly selected from a standard deck of 52 playing cards. What is the probability that it is a face card or a spade?

$$\begin{aligned}
 P(\text{face or spade}) &= P(\text{face}) + P(\text{spade}) - P(\text{spade face}) \quad \text{add overlap} \\
 &= \frac{12}{52} + \frac{13}{52} - \frac{3}{52} \\
 &= \frac{22}{52} = \frac{11}{26}
 \end{aligned}$$