

Key

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

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

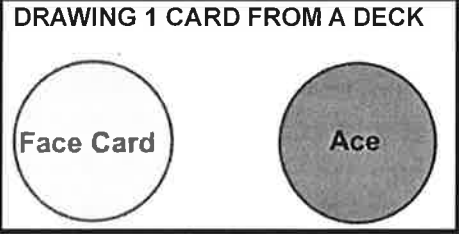
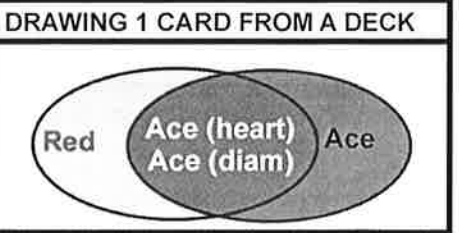
A survey was given to 1800 high school students. Of those 1800 students, 450 participated in a high school activity. Find each probability.

3.) participating in an activity

$$\frac{450}{1800} = \boxed{\frac{1}{4}}$$

4.) not participating in an activity

$$\frac{1350}{1800} = \boxed{\frac{3}{4}}$$

Compound Events
<p>Single Event: Describes a single outcome</p> <p>Compound Event: Made up of 2 or more single events</p> <p>Mutually Exclusive Events (disjoint): Events that cannot both occur in the same trial of an experiment</p>
<p>DRAWING 1 CARD FROM A DECK</p>  <p>The diagram shows two separate circles. The left circle is white and labeled 'Face Card'. The right circle is shaded gray and labeled 'Ace'. They do not overlap.</p>
<p>Inclusive Events (overlapping): Events have 1 or more outcomes in common</p>
<p>DRAWING 1 CARD FROM A DECK</p>  <p>The diagram shows two overlapping ovals. The left oval is white and labeled 'Red'. The right oval is shaded gray and labeled 'Ace'. The overlapping region is shaded gray and contains the text 'Ace (heart)' and 'Ace (diam)'.</p>

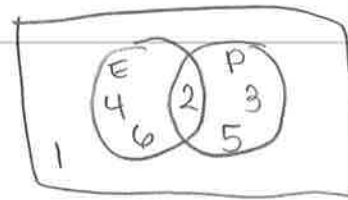
12.3 - 12.4 Compound Events

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

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

Event B: The result is a prime number.

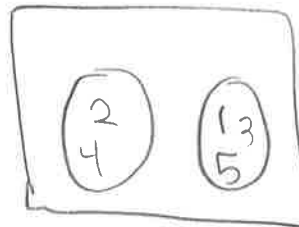
overlapping



b. 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

Compound Events

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?

$$\frac{9}{20} + \frac{2}{5} = \frac{17}{20} = 0.85 = 85\%$$

Compound Events

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?

$$20 + 55 = 75\%$$



Compound Events

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

4 + even - overlap

$$\frac{1 + 3 - 1}{6} = \frac{3}{6} = \boxed{\frac{1}{2}}$$

Compound Events

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

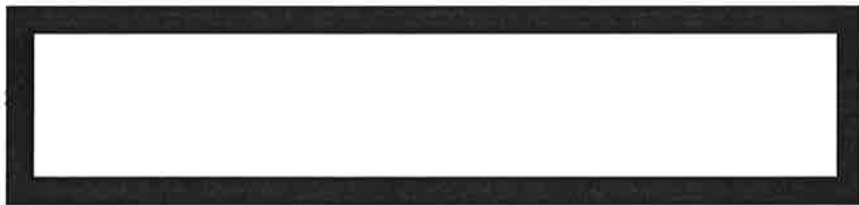
odd + >2 - overlap

$$\frac{3 + 4 - 2}{6} = \boxed{\frac{5}{6}}$$

Compound Events

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).

$$\begin{array}{r} R + F - RF \\ 26 + 12 - 6 \\ \hline 52 \end{array} = \frac{32}{52} = \boxed{\frac{8}{13}}$$



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?

$$\begin{array}{r} 10 + F - 10F \\ 4 + 12 - 0 \\ \hline 52 \end{array} = \frac{16}{52} = \boxed{\frac{4}{13}} \quad \begin{array}{l} 0.308 \\ 30.8\% \end{array}$$

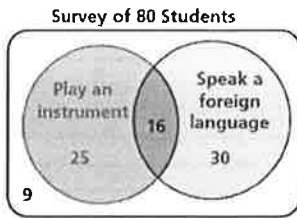
2. A card is randomly selected from a standard deck of 52 playing cards. What is the probability that it is a face card or a spade?

$$\begin{array}{r} F + S - FS \\ 12 + 13 - 3 \\ \hline 52 \end{array} = \frac{22}{52} = \boxed{\frac{11}{26}} \quad \begin{array}{l} 0.423 \\ 42.3\% \end{array}$$

12.3 - 12.4 Compound Events

Work with a partner. A two-way table displays the same information as a Venn diagram. In a two-way table, one category is represented by the rows and the other category is represented by the columns.

The Venn diagram shows the results of a survey in which 80 students were asked whether they play a musical instrument and whether they speak a foreign language. Use the Venn diagram to complete the two-way table. Then use the two-way table to answer each question.



	Play an Instrument	Do Not Play an Instrument	Total
Speak a Foreign Language	16	30	46
Do Not Speak a Foreign Language	25	9	34
Total	41	39	80

In another survey similar to the one above, 106 juniors and 114 seniors respond. Of those, 42 juniors and 77 seniors plan on attending. Organize these results in a two-way table. Then find each probability.

a) $P(\text{junior or attending})$

b) $P(\text{senior and not attending})$

c) $P(\text{not attending})$

d) $P(\text{senior or attending})$

	J	S	T
A	42	77	119
NA	64	37	101
T	106	114	220

a) $\frac{106 + 119 - 42}{220} = \frac{183}{220}$

b) $\frac{114 + 101 - 37}{220} = \frac{178}{220} = \frac{89}{110}$

c) $\frac{101}{220}$

d) $\frac{114 + 119 - 77}{220} = \frac{156}{220} = \frac{39}{55}$

12.3 - 12.4 Compound Events

Out of 200 students in a senior class, 113 students are either varsity athletes or on the honor roll. There are 74 seniors who are varsity athletes and 51 seniors who are on the honor roll. What is the probability that a randomly selected senior is both a varsity athlete *and* on the honor roll?

$$\frac{V + H - VH}{200} = \frac{12}{200}$$

$$\boxed{\frac{3}{50}} \quad 0.06 \quad 6\%$$

Compound Events

Of 1560 students surveyed, 840 were seniors and 630 read a daily paper. The rest of the students were juniors. Only 215 of the paper readers were juniors. What is the probability that a student was a senior or read a daily paper?

$$\frac{S + P - SP}{1560} = \frac{1055}{1560} = \frac{211}{312} \quad 0.676 \quad 67.6\%$$

	J	S	T
P	215	415	630
NP	505	425	930
T	720	840	1560

12.3 - 12.4 Compound Events

1. The American Diabetes Association estimates that 8.3% of people in the United States have diabetes. Suppose that a medical lab has developed a simple diagnostic test for diabetes that is 98% accurate for people who have the disease and 95% accurate for people who do not have it. The medical lab gives the test to a randomly selected person.

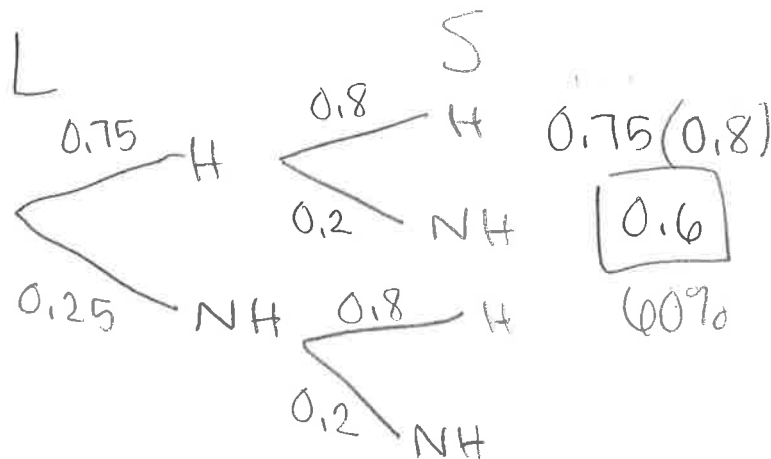
- What is the probability that the diagnosis is correct?
- What is the probability that the diagnosis is *incorrect*?

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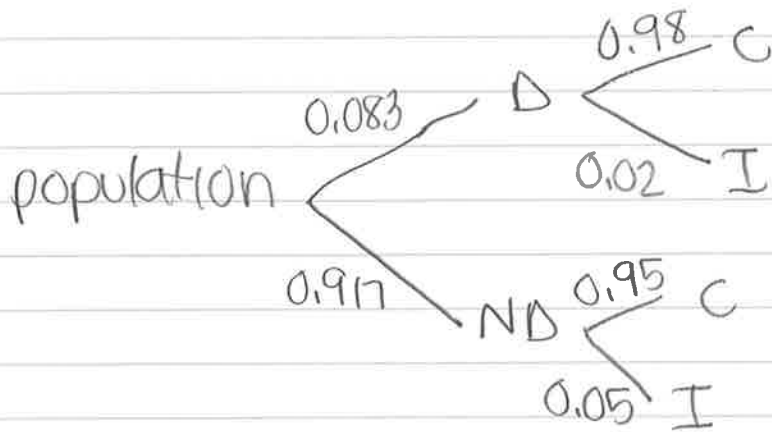
2. A high school basketball team leads at halftime in 60% of the games in a season. The team wins 80% of the time when they have the halftime lead, but only 10% of the time when they do not. What is the probability that the team wins a particular game during the season?

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Consider two archers firing simultaneously at a target. Leah has a probability $\frac{3}{4}$ of hitting a target and Sam has probability $\frac{4}{5}$. Draw a tree diagram to illustrate this situation. Find the probability that both Leah and Sam hit the target.



1.



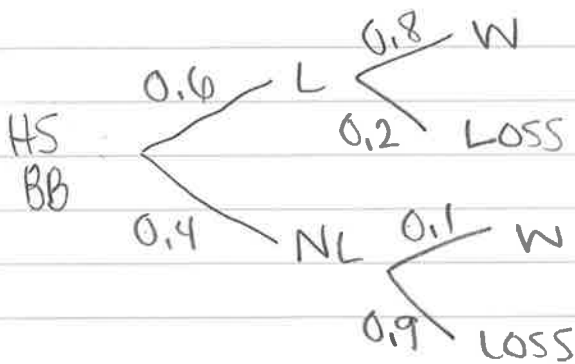
$$a) 0.083(0.98) + 0.917(0.95)$$

$$\boxed{0.952} \quad 95.2\%$$

$$b) 0.083(0.02) + 0.917(0.05)$$

$$\boxed{0.048} \quad 4.8\%$$

2.



$$P(W) = 0.6(0.8) + 0.4(0.1)$$

$$= \boxed{0.78} \quad 78\%$$

More Practice

Of 350 people, 200 are married and 50 are single. The rest of the people are divorced. 54 of those married, smoke. 39 of those single are nonsmokers. There are 38 divorced smokers and 62 divorced nonsmokers. Find each probability.

P(smoker and married)

$$\frac{54}{350} = \frac{27}{175} \quad 0.154 \quad 15.4\%$$

P(divorced or single)

$$\frac{100 + 50}{350} = \frac{150}{350} = \frac{3}{7} \quad 0.429 \quad 42.9\%$$

P(given married, nonsmoker)

$$\frac{146}{200} = \frac{73}{100}$$

	M	S	D	T
SM	54	11	38	103
Non-SM	146	39	62	247
T	200	50	100	350

On Your Own

Of 3510 drivers surveyed, 1950 were male and 103 were color-blind. Only 6 of the color-blind drivers were female. What is the probability that a driver was male or was color-blind?

*Make sure to make a chart

$$(1950 + 103) - 97$$

$$3510$$

$$\frac{1956}{3510} = \frac{326}{585} \quad 0.557 \quad 55.7\%$$

	M	F	T
CB	97	6	103
non CB	1853	1554	3407
T	1950	1560	3510

On Your Own

Five years after 650 high school seniors graduated, 400 had a college degree and 310 were married. Half of the students with a college degree were married. What is the probability that a student has a college degree or is married?

$$D + M - DM$$

$$\frac{400 + 310 - 200}{650}$$

$$\frac{510}{650} = \boxed{\frac{51}{65}} \quad 0.785$$

78.5%

	M	non M	T
D	200	200	400
non D	110	140	250
T	310	340	650

Homework

Compound Events WS (12.3 - 12.4)