Y, R, B, G

Choose 2 without replacement

a) \(rac{4 \cdot 3}{12} = \frac{12}{24} = 2\) ways

b) Y
   - B
   - G
   - R

R
   - B
   - Y

B
   - Y
   - G

G
   - Y
   - R

Y
   - R

Sample space: \{RY, RB, YB, YG, GR, GB\}

C) \(P(\text{exactly 1 Red}) = \frac{6}{12} = \frac{1}{2}\)

D) \(P(\text{at least 1 not Red}) = \frac{12}{12} = 1\)

C) \(P(\text{no Red}) = \frac{6}{12} = \frac{1}{2}\)

Title: Sep 14 - 9:56 AM (1 of 9)
24. \( \text{One card selected} \)

\[ P(\text{Club or Red}) = \]

\[ P(\text{Club}) + P(\text{Red}) - P(\text{Club and Red}) \]

\[ \frac{13}{52} + \frac{26}{52} - \frac{0}{52} = \]

\[ \frac{39}{52} = \frac{3}{4} \]

Getting a club

Getting red card are mutually exclusive events.

They can not happen at the same time.
\[ P(\text{card} > 9 \text{ or black}) = \]

\[ P(\text{card} > 9) + P(\text{black}) - P(\text{card} > 9 \text{ AND black}) \]

\[ \frac{20}{52} + \frac{26}{52} - \frac{10}{52} \]

A, K, Q, J, 10

\[ \frac{46 - 10}{52} = \frac{36}{52} = \frac{9}{13} \]

Card > 9 \text{ not mutually exclusive with black card.}  
They can happen at the same time.
\[ P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B) \]

\[ P(A \text{ or } B) = .6 + .4 - .3 \]

\[ P(A \text{ or } B) = .7 \]

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

\[ .8 = .4 + P(B) - .1 \]

\[ .3 = .3 + P(B) \]

\[ .5 = P(B) \]
Def: 2 events are independent events if the occurrence of one does not affect the probability of the occurrence of the other.

Ex. Flip a coin twice
The 2nd toss is independent of the 1st

Ex. Roll a die several times

Ex. Sex of children

Ex. Draw 2 cards from a standard deck with replacement.
Dependent Events

Probability of 2nd depends upon what happened on the 1st.

Ex: Find \( P(\text{2nd card drawn without replacement is an Ace}) \)
2 cards selected from a deck.

\[
P(\text{1st card is an Ace}) = \frac{4}{52} = \frac{1}{13}
\]

\[
P(\text{2nd card is an Ace}) = \frac{3}{51} = \frac{1}{17} \approx 0.0588
\]

Draw 2 cards without replacement.

\[ P(\text{2nd card is an Ace}) = \frac{1}{17} \text{ if 1st card drawn.} \]

These 2 draws are dependent events.
Example: A couple has 3 children.
Find: P(all boys)

Sample Space: \{BBB, BBG, BBG, BGB, GBB, GBB, GGG, GGG\}

A better way:
P(3 boys) = P(1st boy and 2nd boy and 3rd boy)
= P(B) \cdot P(B) \cdot P(B)
= \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2}
= \frac{1}{8}
2.6 Select 2 cards

a) With replacement

\[ P(3 \text{ and } 3) = P(1st \text{ 3})P(2nd \text{ 3}) \]
\[ = \frac{4}{20} \cdot \frac{4}{20} \]
\[ = \frac{1}{5} \cdot \frac{1}{5} \]
\[ = \frac{1}{25} \]

b) Without replacement

\[ P(1st \text{ 3 and 2nd } 3) = \]
\[ \frac{4}{20} \cdot \frac{3}{19} \]
\[ = \frac{1}{5} \cdot \frac{3}{19} = \frac{3}{95} \]
Friday

12.6 The rest of those assigned