Mutually Exclusive Events:

When two events CAN'T happen at the same time.

Are studying for a test and listening to musich mutally exclusive events? NOT M.E.

These CAN happen at the same time

Are reading a book and sleeping mutally exclusive? Yes M.E.

These CAN'T happen at the same time

Are being 5'3" tall and being able to dunk a basketball mutually exclusive? NOT M.E.

These CAN happen at the same time

Mugsy Bogues was an NBA player at 5'3" tall and he could dunk the ball.

Is each pair of events mutually exclusive?

1. Getting an even number or a 5 when you roll a die. Yes
   These CAN'T happen at the same time
2. Getting a multiple of 3 or an even number when you roll a die.
   These CAN happen at the same time NO
3. Getting a prime number or an even number when rolling a die. NO
   These CAN happen at the same time
4. Rolling a 2 or a 3 on a die. Yes
   These CAN'T happen at the same time

Two events are NOT mutually exclusive if:

they CAN happen at the same time.

Is each pair of events mutually exclusive?

1. Driving your car and texting. NO
   These CAN happen at the same time
2. Driving your car and swimming. Yes
   These CAN'T happen at the same time
3. Two numbers add to 5 and have a product of zero. NO
   These CAN happen at the same time
4. Two numbers have an odd product and an odd sum. Yes
   These CAN'T happen at the same time

Probability of (A or B)

- If A and B are NOT mutually exclusive:

  P(A or B)= P(A) + P(B) - P(A and B)

  P(A and B) usually = P(A) • P(B)

  if A & B can happen at the same time you subtract P(A and B) otherwise, it's like counting them twice

- If A and B ARE mutually exclusive:

  P(A or B)= P(A) + P(B)

  A & B can't happen at the same time so there is nothing to subtract.

6. Find each probability

a) The probability that it snows today= $\frac{1}{100}$ and the probability that my car doesn't start today = $\frac{2}{75}$

Find the following as a fraction.

these CAN happen at the same time

P(snows today or car doesn't start) =

$\frac{75}{7} \cdot \frac{1}{100} + \frac{2}{75} \cdot \frac{100}{100} \quad \frac{1}{100} \cdot \frac{2}{75}$

$\frac{75}{7500} + \frac{200}{7500} - \frac{2}{7500} = \frac{273}{7500}$

b) The probability that you score more than 10 points in the basketball game is $\frac{3}{8}$ and the probability that you don't score any points is $\frac{1}{6}$.

Find P(score > 10 points or score 0 points)=

these can't happen at the same time

Give answer as a percent to the nearest hundredth.

$\frac{3}{8} + \frac{1}{6} = 54.17\%$

The probability that hitter strikes out is 12% and the probability that they get a hit is 30%. Find the probability that, in their next at bat, the hitter strikes out or gets a hit.

Give answer as a percent to the nearest tenth.

These can't happen at the same time

P(strike out or get a hit)=

$12\% + 30\% = 42\%$

Probability of Multiple Events:

P(A and B) ← multiply

- DEP: $P(A) \cdot P(B \text{ after } A)$
- INDEP: $P(A) \cdot P(B)$

P(A or B) ← ADD

- M.E.: $P(A) + P(B)$
- NOT M.E.: $P(A) + P(B) - P(A) \cdot P(B)$

You can now finish Hwk #15. Sec 9-7

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Problems 1-4, 9-12, 20, 22, 36, 39, 48-50

What is the probability that I'm dealt a Royal Flush in Hearts?

How many different 5 card hands can be dealt from a standard deck of cards?

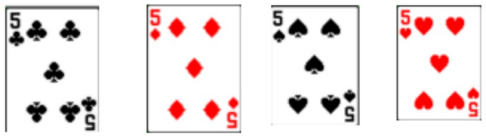
$_{52}C_5 = 2{,}598{,}960$

Probability of getting a Royal Flush in Hearts = $\frac{1}{2{,}598{,}960}$

it's only 1 of all the possible hands you could get.

In the card game of cribbage you get points if your cards add up to 15.

How many ways can you add up to 15 if you have the four 5's in your hand?



it only takes 3 of these 4 cards to add to 15.

$_4C_3 = 4$

You also get points for having pairs of cards. How many pairs of 5 can you make if you have four 5's?

a pair is only 2 of these four cards

$_4C_2 = 6$

This is a garage door opener keypad.
If the code consists of 4 digits how many codes are possible if:

1. A number can't be repeated.

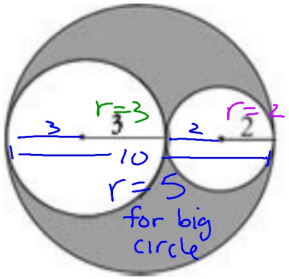
$10 \cdot 9 \cdot 8 \cdot 7$ or $_{10}P_4 = 5040$

2. A number can be repeated.

$10 \cdot 10 \cdot 10 \cdot 10$ or 0000 to 9999

$= 10{,}000$

Find the probability that a point picked at random is in the shaded region. Give answer as a percent to the nearest hundredth.



$$\frac{\text{Big circle} - 2\text{small circles}}{\text{Big Circle}}$$

$$\frac{25\pi - 9\pi - 4\pi}{25\pi}$$

48%