

What's Going On?

Checking In

Minds on

Simple, Conditional or Compound?

Action!

Not!

Consolidation

Beyond Dice, Cards and Coins

Learning Goal - I will be able to answer questions involving probability in real-life situations.

RAFT

Please read something!

Or... work on your assignment!

You may listen to music during RAFT IF YOU
ARE ACTUALLY READING / WORKING ON
YOUR ASSIGNMENT

Minds on

simple probability - probability of a Single event occurring

Examples: flip a coin
roll a dice

compound probability - probability of multiple independent events occurring

Examples: flip 3 coins
roll two dice

conditional probability - probability of an event occurring knowing that some other related event has already occurred

Examples: drawing two cards in a row
removing gum balls from a jar

Simple, Conditional or Compound?

Action!

Not!

The probability of being two dealt two Aces in a row in a game of poker is $\frac{12}{2652}$ 0.5%

What is the fractional probability of NOT being dealt two Aces?

$$P(\text{not } AA) = \frac{2640}{2652}$$

all hands 2652 — hands with AA 12

$$= 2640$$

Action!

Not!

The decimal probability of flipping three heads in a row is 0.125.

What is the decimal probability of NOT flipping three heads in a row?

$$1 - 0.125 = 0.875$$

$$1 - \text{prob it will happen}$$

Action!

Not!

The probability of rolling a sum of 7 on two dice is 16.7%.

What is the percent probability of NOT rolling a sum of 7 on two dice?

$$100\% - 16.7\% = 83.3\%$$

$$100\% - \text{prob. it will happen}$$

Child #

$$P(B) \quad \frac{1}{2} \quad \times \quad \frac{1}{2} \quad \times \quad \frac{1}{2}$$

$$P(BBB) = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$$

$$P(BBB) = \left(\frac{1}{2}\right)^3$$
$$= \frac{1^3}{2^3} = \frac{1}{8}$$

Consolidation

Beyond Dice, Cards and Coins

This year, Tim Horton's Roll Up the Rim To Win promotion boasted odds of winning at 1 in 6.

Based on these odds, **what is the probability that you would win**

a. Twice in a row?

$$P(2W) = \frac{1}{6} \times \frac{1}{6} = \frac{1}{36} = 2.8\%$$

$\hookrightarrow \left(\frac{1}{6}\right)^2$

b. Five times in a row?

$$P(5W) = \left(\frac{1}{6}\right)^5 = \frac{1}{6^5} = \frac{1}{7776} = 0.0\%$$

\downarrow
Y^x

c. Twenty times in a row?

$$P(20W) = \left(\frac{1}{6}\right)^{20} = \frac{1}{365615544.00000000}$$

0.0000000000000000000000 27%
basically 0%

Consolidation

Beyond Dice, Cards and Coins

This year, Tim Horton's Roll Up the Rim To Win promotion boasted odds of winning at 1 in 6.

Based on these odds, **what is the probability that you would**

a. Lose 3 times in a row?

$$P(3L) = \left(\frac{5}{6}\right)^3 = \frac{5^3}{6^3} = \frac{125}{216}$$

57.9%

b. Lose 6 times in a row?

$$P(6L) = \left(\frac{5}{6}\right)^6 = \frac{5^6}{6^6} = \frac{15625}{46656}$$

= 33.5%

c. Lose 20 times in a row?

$$P(20L) = \left(\frac{5}{6}\right)^{20} = (0.833)^{20} = 0.026$$

2.6%

6²⁰ = weird number

Consolidation

Beyond Dice, Cards and Coins

This year, Tim Horton's Roll Up the Rim To Win promotion boasted odds of winning at 1 in 6.

In one of their regions, they distributed 46,571,280 cups.

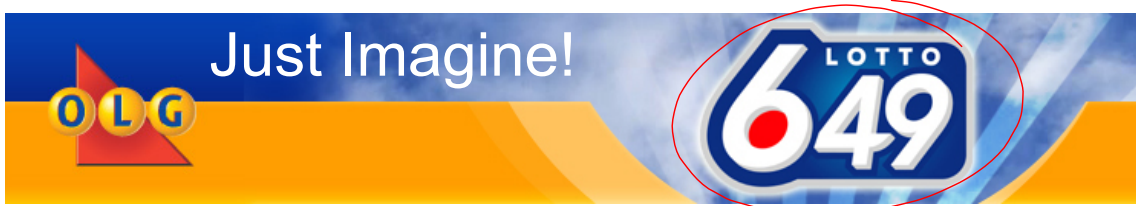
How many of these cups were winners?

$$\frac{46,571,280}{6} = 7,761,880$$

$\frac{1}{6}$ are winners

Consolidation

Beyond Dice, Cards and Coins



When playing **LOTTO 649**, players choose 6 numbers between 1 and 49 (get it?!)

Each number must be different.

What is your probability of winning the LOTTO?

$$\frac{1}{49} \times \frac{1}{48} \times \frac{1}{47} \times \frac{1}{46} \times \frac{1}{45} \times \frac{1}{44}$$

$$\frac{1}{10000000000}$$

1 in 10 billion!

1 in 10 billion!

Consolidation

Beyond Dice, Cards and Coins

Some stats about 911 calls in Montreal during 2010

1,405,309 total calls

87,416 non-emergency calls

772,920

Police Related

112,425

Public Works Related

56,212

Fire Related

252,956

Ambulance Related

210,796

Other

772,920

Made from a Land Line

632,389

Made from a Cell Phone

Consolidation

Beyond Dice, Cards and Coins

What is the probability that:

a) The call was Fire related?

$$\frac{56212}{1405309} = 0.04 = 4\%$$

b) The call was not Fire related?

c) The call was Police related?

d) The call was Fire or Police related?

e) The call was Public Works or Ambulance related?

f) The call was Police or Fire or Ambulance related?

g) The call came from a cell phone?