

BE-IB | TUESDAY 4-29-08

FIND THE PROBABILITY:

- ① Rolling a 6 on a single die.
ONE die, two dice
- ② Choosing the right answer on a MATH quiz by guessing (multiple choice, a, b, c, or d).
- ③ Rolling a 7 on a single die.
- ④ Rolling ≤ 6 on a single die.
- ⑤ Picking a red chip out of a bucket of 8 red, 4 blue, and 6 green chips.

The ABOVE ARE ARE called simple probability.

↑
Single events.

- Rolling 2 sixes in a row.
 - Choosing 2 answers in a row.
- } Compound probability

↑
MORE THAN ONE

" " " " " "

ESTIMATING large products or quotients
using SCIENTIFIC NOTATION.

$$\text{Ex) } {}_{16}P_{11} = \frac{16!}{(16-11)!} = \frac{16!}{5!}$$

$$16 \cdot 15 \cdot 14 \cdot 13 \cdot 12 \cdot 11 \cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6$$

$$\begin{array}{r} \swarrow \\ 16 \\ \times 15 \\ \hline 80 \\ 16 \\ \hline 240 \end{array} \quad \begin{array}{r} \swarrow \\ 14 \\ \times 13 \\ \hline 42 \\ 14 \\ \hline 182 \end{array} \quad \begin{array}{r} \swarrow \\ 12 \\ \times 11 \\ \hline 12 \\ 12 \\ \hline 132 \end{array} \quad \begin{array}{r} \swarrow \\ 9 \\ \times 10 \\ \hline 90 \end{array} \quad \begin{array}{r} \swarrow \\ 8 \\ \times 7 \\ \hline 56 \end{array} \quad \begin{array}{r} \swarrow \\ 6 \end{array}$$

$$\begin{array}{ccccccc} \downarrow & \uparrow & \downarrow & & \uparrow & & \\ 2 \times 10^2 & \cdot & 2 \times 10^2 & \cdot & 1 \times 10^2 & \cdot & 9 \times 10^1 \cdot 6 \times 10^1 \cdot 6 \end{array}$$

$$5 \times 10^6 \cdot 54 \times 10^2 \cdot 6 \times 10^0$$

$$5 \times 10^6 \cdot 324 \times 10^2$$

$$5 \times 10^6 \cdot 3 \times 10^4$$

$$15 \times 10^{10}$$

$$\boxed{1.5 \times 10^{11}} \text{ vs } \boxed{174,356,582,400}$$

1.74×10^{11}

Ch. 14-3 PROBABILITY OF Compound EVENTS

↓
(MORE THAN 1)

FIND THE probability of each event
then multiply probabilities.

$P(6)$ on a dice roll is $\frac{1}{6}$

$$\text{Two sixes} \Rightarrow \frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$$

$$P(\text{Right answer}) \Rightarrow \frac{1}{4}$$

$$P(\text{two right answers}) \Rightarrow \frac{1}{4} \cdot \frac{1}{4} = \frac{1}{16}$$

$$P(3 \text{ right}) \Rightarrow \left(\frac{1}{4}\right)^3 = \frac{1}{64}$$

WATCH OUT for dependant events?

ⓧ Box of 20 chips, 6 red, 12, blue, 2 green.

$P(\text{red, green}) \Rightarrow$ RED on 1st pull
green on 2nd pull.

It doesn't say chips are replaced
so events are dependant!

$$P(\text{red}) = \frac{6}{20} = \frac{3}{10}$$

$$\downarrow$$

$$P(\text{green}) = \frac{2}{19}$$

$$P(r, g) = \frac{3}{10} \cdot \frac{2}{19} = \frac{6}{190} = \boxed{\frac{3}{95}}$$

EX2 (A)
Pg 770

Bag, 8 red marbles, 12 blue,
9 yellow, 11 green.

$$P(r, b, g) = ?$$

$$P(r, b, g) = \frac{8}{40} \cdot \frac{12}{39} \cdot \frac{11}{38}$$

$$= \frac{1}{5} \cdot \frac{4}{13} \cdot \frac{11}{19}$$

$$= \frac{22}{65 \cdot 19}$$

$$P(r, b, g) = \frac{22}{1235}$$

$$\begin{array}{r} 65 \\ \times 19 \\ \hline 585 \\ 65 \\ \hline 1235 \end{array}$$

$$\textcircled{B} \quad P(b, y, y) = ?$$

$$P(b, y, y) = \frac{12}{40} \cdot \frac{9}{39} \cdot \frac{8}{38}$$

$$= \frac{36}{65 \cdot 38}$$

$$= \frac{36}{65 \cdot 38}$$

$$P(b, y, y) = \frac{36}{2470} = \frac{18}{1235}$$

$$\begin{array}{r} 65 \\ \times 38 \\ \hline 520 \\ 195 \\ \hline 2470 \end{array}$$

Some STANDARD deck of card Reminders

52 cards

4 SUITS $\Rightarrow$ Hearts, Clubs, Diamonds, Spades

13 cards in each SUIT A, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, J, Q, K

26 red cards $\Rightarrow$ Hearts, Diamonds

26 black cards $\Rightarrow$ Clubs, Spades.

4 Aces, 2 red, 2 black

4 two's

4 three's

⋮
etc.

$$P(\text{heart}) = \frac{13}{52} = \frac{1}{4}$$

$$P(\text{heart or diamond}) = \frac{1}{4} + \frac{1}{4} = \frac{1}{2}$$

↑
ADD

6.
If A probability is "duplicated",
you need to subtract the extra
probability from the total.

Ex) $P(\text{Ace or Spade})$

$$P(\text{Ace}) = \frac{4}{52} = \frac{1}{13}$$

$$P(\text{Spade}) = \frac{13}{52}$$

BUT the Ace of spades is counted
twice, so subtract $\left(\frac{1}{52}\right)$ from final answer.

$\swarrow$ $P(\text{Ace of Spades})$

$$P(\text{Ace or Spade}) = \left(\frac{4}{52} + \frac{13}{52} \right) - \frac{1}{52}$$

$$= \frac{17}{52} - \frac{1}{52}$$

$$= \frac{16}{52} = \frac{4}{13}$$

Homework: Pg 773 # 5 to 12.