Statistics

Lecture 7

Feb 19-8:47 AM

In-Person QZ 5

x	y
6	10
8	15
10	25
5	10
9	12
5	12

Find

- ✓ $a = -.4$
- ✓ $b = 2.0$
- ✓ $r^2 = 57\%$
- ✓ $r = .756$

} Round to 1-decimal

} Round to whole %

} round to 3-decimal.

Jul 3-7:00 PM

Suppose $P(A) = .35$, $P(B) = .45$, $P(A \text{ and } B) = .2$

1) $P(\bar{A}) = 1 - P(A) = \boxed{.65}$

2) $P(\overline{A \text{ and } B}) = 1 - P(A \text{ and } B) = \boxed{.8}$

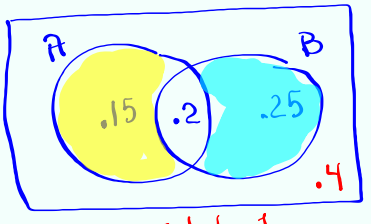
3) $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

$= .35 + .45 - .2 = \boxed{.6}$

4) Make Venn Diagram

$.35 - .2 = .15$

$.45 - .2 = .25$



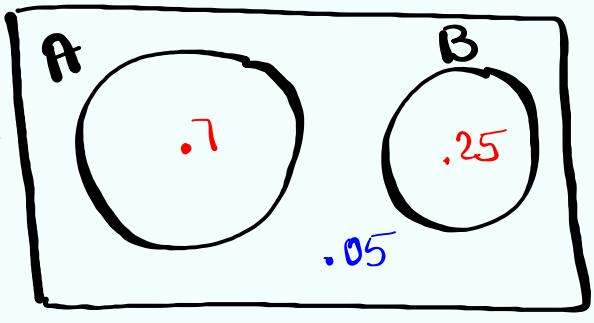
Total = 1

5) $P(A \text{ only OR } B \text{ only}) = .15 + .25 = \boxed{.4}$

Jul 8-4:30 PM

$P(A) = .7$, $P(B) = .25$ A & B are M.E.

$P(\bar{A}) = .3$ $P(\bar{B}) = .75$ $P(A \text{ and } B) = 0$



Total = 1

$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B) = \boxed{.95}$

$P(\overline{A \text{ or } B}) = 1 - .95 = \boxed{.05}$

Jul 8-4:36 PM

Multiplication Rule

Keyword AND

Multiple Action Event

Flip a fair coin twice
HH
HT
TH
TT

having 3 children
BBB GBB
BBG GBG
BGB GGB
BGG GGG

Draw 2 cards from a deck of playing cards
FF
$F\bar{F}$
$\bar{F}F$
$\bar{F}\bar{F}$

Jul 8-4:40 PM

If events A and B are independent events, one outcome does not change the Prob. of next outcome

$P(A \text{ and } B) = P(A) \cdot P(B)$

$P(A) = .7$ $P(B) = .4$ A & B are independent events.

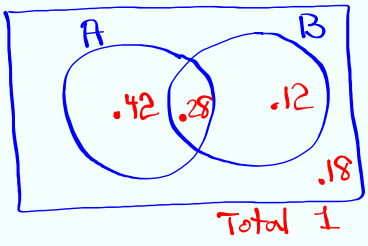
$P(\bar{A}) = 1 - .7 = \boxed{.3}$

$P(\bar{B}) = 1 - .4 = \boxed{.6}$

$P(A \text{ and } B) = P(A) \cdot P(B)$
$= (.7)(.4) = \boxed{.28}$

$.7 - .28 = .42$

$.4 - .28 = .12$



Jul 8-4:45 PM

Draw 2 cards with replacement from a full deck of playing cards.

$P(\text{2 face cards}) = \frac{12}{52} \cdot \frac{12}{52} = \boxed{\frac{9}{169}}$

12 ÷ 52 · 12 ÷ 52 MATH 1:▶Frac Enter

$P(\text{2 Aces}) = \frac{4}{52} \cdot \frac{4}{52} = \boxed{\frac{1}{169}}$

Suppose we draw 3 cards, with replacement

P(Red card, followed by face card, then an Ace)

$\frac{26}{52} \cdot \frac{12}{52} \cdot \frac{4}{52} = \boxed{\frac{3}{338}}$

Jul 8-4:50 PM

A quiz has 4 questions, True/false only. You make random guesses.

$P(\text{All Correct}) = \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2}$

$= \frac{1}{16} = .0625 \approx \boxed{.063}$

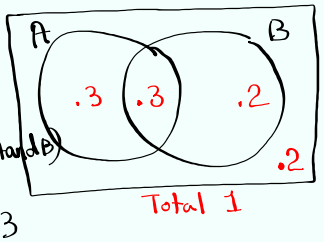
Jul 8-4:58 PM

$P(A) = .6$, $P(B) = .5$ A and B are independent events

$P(\overline{A}) = 1 - P(A) = .4$

$P(A \text{ and } B) = P(A) \cdot P(B) = (.6)(.5) = .3$

Make Venn Diagram



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

$= .6 + .5 - .3$

$= .8$

$P(\overline{A} \text{ or } \overline{B}) = P(\overline{A \text{ and } B}) = 1 - .3 = .7$

De Morgan's Law

$P(\overline{A} \text{ and } \overline{B}) = P(\overline{A \text{ or } B}) = 1 - .8 = .2$

Jul 8-5:01 PM

Suppose Prob. that any student pass a math class is .6.

Randomly Select 3 students,

$P(\text{All Pass}) = (.6)(.6)(.6) = .216$

$P(\text{None of Pass}) = (.4)(.4)(.4) = .064$

Jul 8-5:09 PM

4 students party all night and missed exam on next day.

One suggest that let's say we had a flat tire.

Prof. agreed for late exam, put them in different rooms and asked that what tire was flat.

P(all picked same tire) =

$$\frac{4}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4}$$

$$= \frac{1}{64} = \boxed{.016}$$ Rare event

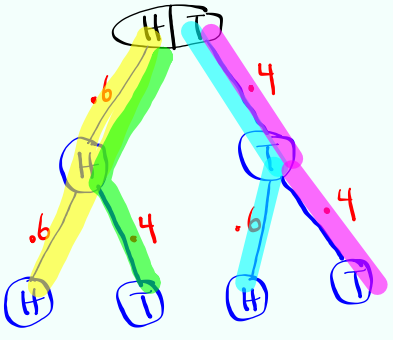
Jul 8-5:12 PM

Tree Diagram

Flip a loaded coin Twice

P(H) = .6

P(T) = .4



P(HH) = (.6)(.6) = .36

P(HT) = (.6)(.4) = .24

P(TH) = (.4)(.6) = .24

P(TT) = (.4)(.4) = .16

Total = 1

P(at least one Tail) = .24 + .24 + .16 = .64

Jul 8-5:18 PM