Statistics

Lecture 6

Feb 19-8:47 AM

Class QZ 7

Box Your final Ans.

Given Regression line $y = 45 - 8x$, $\Sigma y = 50$, $n = 5$

Predict y when $x = 4$ if

1) r is significant.

use regression line $y = 45 - 8(4) = 45 - 32 = \boxed{13}$

2) r is not Significant.

use $\bar{y} = \frac{\Sigma y}{n} = \frac{50}{5} = \boxed{10}$

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Class QZ 6

Use the chart below

x	y
5	12
6	15
6	18
7	20
4	10
8	20

Find

$a = -.967 \approx \boxed{-1}$

$b = 2.8 \approx \boxed{3}$

$y = 3x - 1$

$y = -1 + 3x$

Round to whole #

$r^2 = .883 \approx \boxed{88\%}$ Round to whole %

$r = \boxed{.939}$ Round to 3-decimal

x→L1

y→L2

STAT → CALC

8: LinReg(a+bx)

Xlist: L1

Ylist: L2

Clear

Calculate

Mar 5-9:05 PM

Intro. to probabilities

SG 10

E → Desired event (outcome)

P(E) → Prob. that E happens

Acceptable Answers:

1) Reduced fraction

2) Round to 3-decimal Places

3) Scientific Notation

$P(E) = \frac{\text{Total \# of all desired outcomes}}{\text{Total \# of all outcomes}}$

ex: A box has 10 Red and 15 Blue balls. If we randomly select one ball, find the Prob. that it is red.

$P(\text{Red}) = \frac{\cancel{10}^{2}\ \text{total red balls}}{\cancel{25}_{5}\ \text{total balls}}$ $P(\text{Red}) = \frac{2}{5}$

10 ÷ 25 Math 1:▶Frac Enter

Math 2:▶Dec Enter

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A standard deck of playing cards has 52 cards, 26 red, 12 face cards, and 4 aces.

If we randomly draw one card, find the Prob. of getting

1) Red

$P(\text{Red}) = \frac{26}{52} = \boxed{\frac{1}{2}} = \boxed{.5}$

2) face card

$P(\text{Face}) = \frac{12}{52} = \boxed{\frac{3}{13}} \approx \boxed{.231}$

3) ace

$P(\text{Ace}) = \frac{4}{52} = \boxed{\frac{1}{13}} \approx \boxed{.077}$

4) Red ace

$P(\text{Red ace}) = \frac{2}{52} = \boxed{\frac{1}{26}} = \boxed{.038}$

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$E \rightarrow$ Desired Event

$P(E) \rightarrow$ Prob. that E happens

$\bar{E} \rightarrow$ Not E, E-bar, E Complement

$P(E) + P(\bar{E}) = 1$ Complement Rule

$P(\bar{E}) = 1 - P(E)$

A box has 10 Red, 15 Blue, and 5 white color balls. Suppose we randomly select one ball,

1) $P(\text{Red}) = \frac{10}{30} = \boxed{\frac{1}{3}} = \boxed{.333}$

2) $P(\overline{\text{Red}}) = 1 - P(\text{Red})$

$= 1 - \frac{1}{3} = \boxed{\frac{2}{3}} \approx \boxed{.667}$

3) $P(\text{Red or Blue}) = \frac{25}{30} = \boxed{\frac{5}{6}}$

4) $P(\text{Red and Blue})$

$= \frac{0}{30} = \boxed{0}$

Do not use $\emptyset$ for 0.

Mar 12-7:34 PM

John has a birthday next week. Find the prob. that his birthday happens on Tuesday.

$$\frac{1 \text{ Tuesday}}{7 \text{ Days}} = \boxed{\frac{1}{7}}$$

Find the prob. that today is Majid's birthday.

$$\frac{1 \text{ day}}{365 \text{ Days}} = \frac{1}{365}$$

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Some Prob. Rules & Terms:

1) $0 \leq P(E) \leq 1$

2) Sum of all prob. of all possible events is always 1.

3) $P(E) = 1 \iff$ Sure event

4) $P(E) = 0 \iff$ Impossible event

5) $0 < P(E) \leq .05 \iff$ Rare event

6) $P(\bar{E}) = 1 - P(E)$ Complement Rule

$P(\text{Rains}) = .25$ $\quad P(\overline{\text{Rain}}) = 1 - P(\text{Rains})$

$= 1 - .25 = \boxed{.75}$

Mar 12-7:47 PM

Did You Vote Last week? I Surveyed 80 people

	Yes	No	Total
Male	20	15	35
Female	10	35	45
Total	30	50	80

If we randomly Select one of them,

1) $P(\text{Male}) = \frac{35}{80} = \frac{7}{16}$

2) $P(\text{Yes}) = \frac{30}{80} = \frac{3}{8}$

3) $P(\text{Male and Yes}) = \frac{20}{80} = \frac{1}{4}$

4) $P(\text{Male or Yes}) = \frac{45}{80} = \frac{9}{16}$

SG 10

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Addition Rule: SG 11

Keyword: OR

Single Action event

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

ex: $P(A) = .3$, $P(B) = .8$, $P(A \text{ and } B) = .25$

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

$P(\overline{B}) = 1 - P(B) = 1 - .8 = .2$

$P(\overline{A \text{ and } B}) = 1 - P(A \text{ and } B) = 1 - .25 = .75$

(Complement Rule)

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

$= .3 + .8 - .25 = .85$

$P(\overline{A \text{ or } B}) = 1 - P(A \text{ or } B) = 1 - .85 = .15$

Mar 12-8:12 PM

$P(HB) = .45$

$P(FF) = .35$

$P(HB \text{ and } FF) = .25$

1) $P(\overline{HB}) = 1 - .45 = \boxed{.55}$

2) $P(\overline{FF}) = 1 - .35 = \boxed{.65}$

3) $P(HB \text{ or } FF) = P(HB) + P(FF) - P(HB \text{ and } FF)$

↑ Addition Rule

$= .45 + .35 - .25 = \boxed{.55}$

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Mutually Exclusive Events

"Disjoint Events"

A & B are M.E.E. $\Leftrightarrow P(A \text{ and } B) = 0$

E: $P(A) = .32$, $P(B) = .6$, A & B are M.E.E.

1) $P(\overline{A}) = 1 - P(A) = \boxed{.68}$

2) $P(\overline{B}) = 1 - P(B) = \boxed{.4}$

3) $P(A \text{ and } B) = \boxed{0}$

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

$= .32 + .6 - 0$

$= \boxed{.92}$

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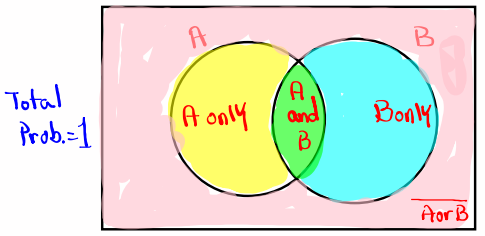
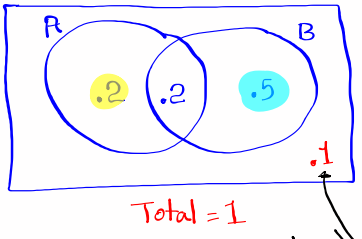
Addition Rule with Venn Diagram



$P(A) = .4$, $P(B) = .7$, $P(A \text{ and } B) = .2$

$P(A \text{ only}) = .4 - .2 = .2$

$P(B \text{ only}) = .7 - .2 = .5$



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

$= .4 + .7 - .2 = \boxed{.9}$

$P(\overline{A \text{ or } B}) = 1 - P(A \text{ or } B) = 1 - .9 = \boxed{.1}$

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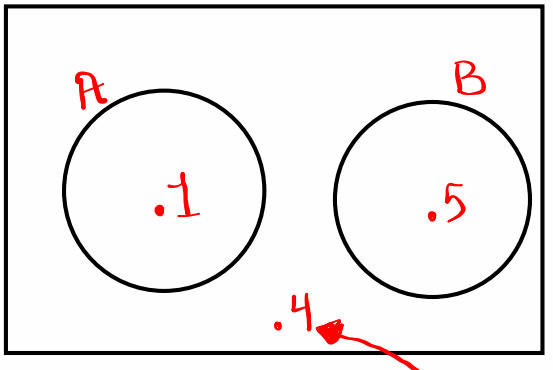
$P(A) = .1$

$P(B) = .5$

A & B are disjointed events



$P(\overline{A}) = \boxed{.9}$

$P(\overline{B}) = \boxed{.5}$

$P(A \text{ and } B) = \boxed{0}$

$P(A \text{ or } B) = .1 + .5 - 0 = \boxed{.6}$

$P(\overline{A \text{ or } B}) = \boxed{.4}$

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De Morgan's Law:

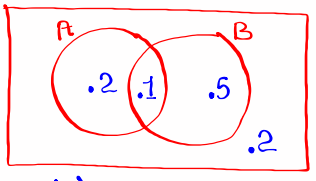
$P(\overline{A} \text{ and } \overline{B}) = P(\overline{A \text{ or } B})$

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

$P(A) = .3$, $P(B) = .6$ $P(A \text{ and } B) = .1$

$P(A \text{ only}) = .3 - .1 = .2$

$P(B \text{ only}) = .6 - .1 = .5$



$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ Total = 1

$= .3 + .6 - .1 = .8$

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

De Morgan's Law

$P(\overline{A} \text{ or } \overline{B}) = P(\overline{A \text{ and } B}) = 1 - P(A \text{ and } B) = 1 - .1 = .9$

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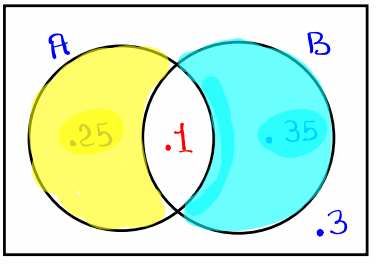
Complete the Venn Diagram below



1) $P(A) = .35$

2) $P(B) = .45$

3) $P(A \text{ and } B) = .1$

Total Prob. = 1

4) $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B) = .7$

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

De Morgan's Law

6) $P(\overline{A} \text{ or } \overline{B}) = P(\overline{A \text{ and } B}) = 1 - .1 = .9$

7) $P(A \text{ only OR } B \text{ only}) = .25 + .35 = .6$

add

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Class QZ 8

class MP	class F
15	8
25	12
35	15
45	10
55	5

class MP → L1
class F → L2
Find

1) $\bar{x} = 33.4 \approx \boxed{33}$
2) $S = 12.182 \approx \boxed{12}$

} Round to whole #

3) $n = \boxed{50}$
4) $S^2 = \boxed{\frac{7272}{49}}$

} Reduced fraction

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