Statistics

Lecture 8

Feb 19-8:47 AM

Class Quiz 1

Consider the Sample below

12	18	10	15	20
15	18	24	16	20

Find

1) $\bar{x} = 16.8$

2) $S = 4.104$

3) S^2 in reduced fraction

Store data in L1

1-Var Stats with L1

VARS

5: Statistics

3: S_x

x^2 MATH 1: ▶Frac

Enter

$S^2 = \frac{758}{45}$

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Complete the chart below

class limits	class MP	class F
12 – 18	15	5
19 – 25	22	8
26 – 32	29	10
33 – 39	36	2

+7, +7, +7

1) How many classes? 4

2) class width 7

3) Sample Size

$n = \sum f$

$= 5+8+10+2$

$= \boxed{25}$

class MP → L1

class F → L2

STAT → CALC

1: 1-Var Stats

L1 & L2

$\bar{x} = 24.52$

$S = 6.352$

$n = 25$

VARS

5: Statistics

3: S_x

$S^2 = \frac{12403}{300}$

S^2 in reduced fraction

x^2 MATH 1: ▶Frac Enter

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Find the 5-number summary for data below:

78 82 90 100 70

65 80 95 72 50

55 68 93 88 75

Store in L1

1-Var Stats with L1

Min. = 50

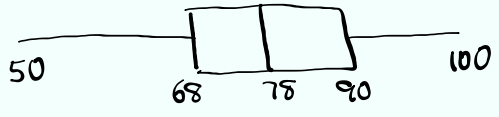
Q_1 = 68

Med. = 78

Q_3 = 90

Max. = 100

Draw Box Plot



$IQR = Q_3 - Q_1 = 90 - 68 = 22$

Upper fence $= Q_3 + 1.5(IQR) = 90 + 1.5(22) = 123$

Lower fence $= Q_1 - 1.5(IQR) = 68 - 1.5(22) = 35$

No outliers

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Consider the Stem Plot below

3	0 2 8
4	2 3 5 5 7
5	0 2 5 5 5 8 9
6	3 4 5 6 6
7	2 3 5 8
8	0

1) $n = 25$

2) Range $= 80 - 30 = 50$

3) Estimate $S \approx \frac{\text{Range}}{4} = \frac{50}{4} = 12.5$

4) Mode $= 55$

5) Find P_{20}

$L = \frac{20}{100} \cdot 25 = 5$

$P_{20} = \frac{5\text{th} + 6\text{th}}{2} = \frac{43+45}{2} = 44$

20% | 80%

$P_{20} = 44$

6) Find P_{65}

$L = \frac{65}{100} \cdot 25 = 16.25 \rightarrow L = 17$

$P_{65} = 17\text{th element} = 64$

7) Find K Such that

$P_K = 70$ Below

$K = \frac{B}{n} \cdot 100 = \frac{20}{25} \cdot 100 = 80$

Whole %

80% | 20%

70

$P_{80} = 70$

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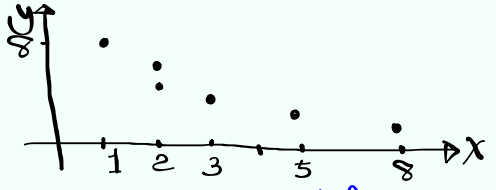
Consider the chart below

x	y
1	8
2	6
2	5
3	3
5	2
8	1

1) Draw Scatter Plot



2) $x \rightarrow L1$, $y \rightarrow L2$

STAT → CALC

2-Var Stats

$\sum x = 21$ $\quad \sum y = 25$

$\sum x^2 = 107$ $\quad \sum y^2 = 139$

$n = 6$ $\quad \sum xy = 57$

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Use STAT → CALC

8: LinReg(a+bx) with L1 & L2

$a = 7.353$

$b = -.910$

$\Rightarrow y \approx 7.4 - .9x$

80% of Y-values are explained by x-values

$r^2 = .797 \Rightarrow r^2 \approx 80\%$

$r = -.893$ $\quad -1 \le r \le 1$

If r is close to ±1 → Correlation is Significant

If r is close to 0 → Linear Correlation is not Significant.

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Study time	Exam Score
8	92
9	90
10	95
6	80
7	85
5	70

Study time → x → L1

Exam Score → y → L2

use LinReg(a+bx)

$a = 50.619 \approx 51$

$b = 4.629 \approx 5$

$r^2 = .886 \approx 89\%$

$r = .941$

Regression line

$y \approx 51 + 5x$

89% of exam Scores are explained by Study time.

r is very close to 1 → Linear Correlation Seems to be Significant

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Predict exam score for $\underbrace{7 \text{ hours}}_{x}$ of study time

1) Assume r is Significant

Use Regression line

$y = 51 + 5x = 51 + 5(7) = 51 + 35 = \boxed{86}$

2) Assume r is not Significant.

Use $\bar{y}$

VARS | 5:Statistics | 5:$\bar{y}$ | Enter $\quad 85.\bar{3} \approx \boxed{85}$

Mar 10-2:50 PM

Intro. to Probabilities:

E → Desired outcome or event

P(E) → Prob. that E happens

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

A box has 3 Red, 2 white, and 5 blue balls. one ball is randomly selected.

$$P(\text{Red Color}) = \frac{3 \text{ red Colors}}{10 \text{ Total balls}} = \boxed{\frac{3}{10}} = \boxed{.3}$$

$$P(\text{white Color}) = \frac{2 \text{ white}}{10 \text{ Total balls}} = \frac{2}{10} = \boxed{\frac{1}{5}} = \boxed{.2}$$

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Standard deck of playing cards

52 Cards

26 Red

12 Face

4 Aces

Draw one Card

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

$P(\text{Face}) = \frac{12}{52} = \frac{3}{13}$

12 ÷ 52 (Math)

1: ▶Frac (Enter)

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

$P(\text{Face or Ace}) = \frac{12+4}{52} = \frac{16}{52} = \boxed{\frac{4}{13}}$

$P(\text{Face and Ace}) = \frac{0}{52} = \boxed{0}$

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What is the Prob. that a randomly Selected Person has a birthday

1) Today $\frac{1}{365}$

2) this week $\frac{1}{52}$

3) this Month $\frac{1}{12}$

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

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

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

4) $0 < P(E) \leq .05 \iff$ Rare event

5) Sum of all probabilities is 1.

$$\sum P(E) = 1$$

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$E \rightarrow$ Desired Event

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

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

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

$P(\text{Rain}) = .2$

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

$= 1 - .2 = .8$

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4 Red, 7 White, 5 Blue balls

One ball is selected.

$P(\text{Red}) = \frac{4}{16} = \boxed{\frac{1}{4}} = \boxed{.25}$

$P(\overline{\text{Red}}) = 1 - P(\text{Red}) = 1 - \frac{1}{4} = \boxed{\frac{3}{4}} = \boxed{.75}$

1 [−] 1 [÷] 4 [Math] [1:▶Frac] [Enter]

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Do You Support tariffs on products from Mexico and Canada?

	Yes	NO	Total
Females	15	45	60
Males	50	10	60
Total	65	55	120

If one person is randomly selected,

$P(\text{Female}) = \frac{60}{120} = \frac{1}{2}$ $P(\text{Yes}) = \frac{65}{120} = \frac{13}{24}$

$P(\text{Females and Yes}) = \frac{15}{120} = \boxed{\frac{1}{8}}$

$P(\text{Female or Yes}) = \frac{110}{120} = \boxed{\frac{11}{12}}$

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Select one number from 1 to 30.

P(Selection is less than 5) $= \frac{4}{30} = \frac{2}{15}$

P(Selection is atleast 25) $= \frac{6}{30} = \frac{1}{5}$

P(Selection is multiple of 4) $= \frac{7}{30}$

4, 8, 12, 16, 20, 24, 28

P(Selection is even and odd number)

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

Sc 10

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