

Stat 300
Spring 2024
Exam 1, February 21

No books, scratch paper, phones.
Calculator and formula sheet (3 double-sided pages) allowed.
Please show all your work and clearly mark your answers.
If a problem is too hard, move on to an easier one.

Problem	Pts	Possible
1		25
2		25
3		25
4-6		13
7-8		12
Total		100

Name (printed):

Key

Name (signature):

Score for the
class so far:

_____ out of _____ points

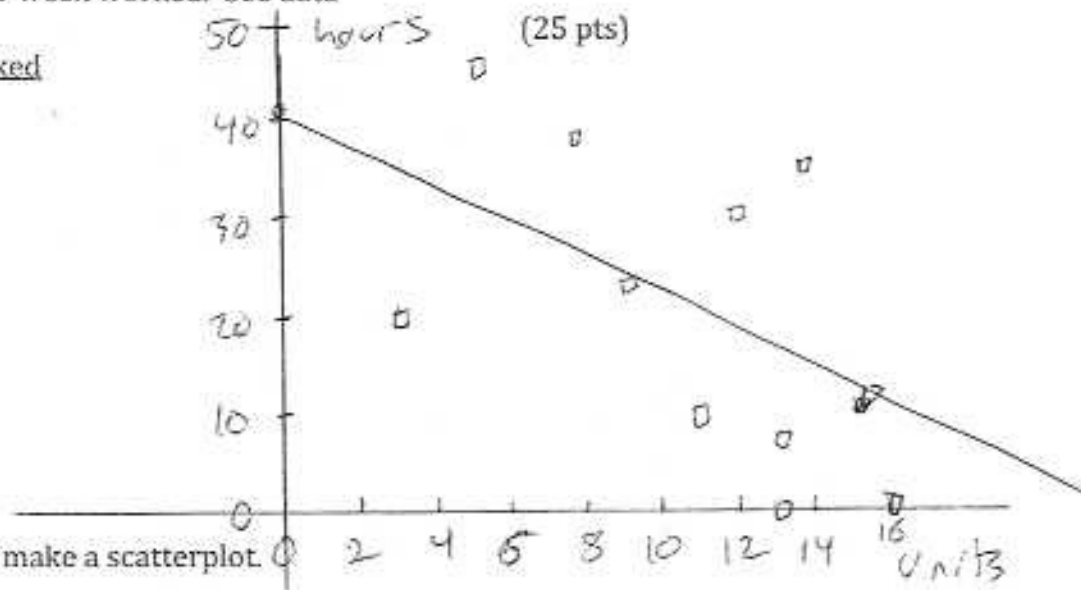
Percent:

_____ %

Approx letter grade:

1) A community college administrator studies the relationship between units taken by students and hours per week worked. See data

Units	Hours worked
3	20
5	45
8	38
9	22
11	10
12	30
13	0
13	8
14	35
15	11
16	0



a) In the space provided, make a scatterplot. Use the indicated scale.

b) Find the equation of best-fit line. Use units for x . Plot the line on your scatterplot above.

$$\hat{y} = -2.058x + 42.2$$

c) Find the correlation coefficient r . Describe what your value of r means.

$$r = -0.55 \quad \text{negative moderate correlation}$$

d) Use the linear model to predict the expected number of hours worked by a student taking 10 units. Show work please. No work, no credit.

$$\hat{y} = -20.58 + 42.2 = \boxed{21.6 \text{ hours}}$$

e) Fill in: For every additional unit taken, the average number of hours worked

goes down by 2.058 hours. (Note: first blank should be "up" or "down.")

f) Which variable is the response variable?

hours

2) The average amount of time to fill out the FAFSA is approximately normally distributed with mean 48.3 minutes, and standard deviation 11.6 minutes.

(25 points)

a) What percent of people take more than 60 minutes to fill out the FAFSA?

$$z = 1.01 \quad \text{ATL} = 84.38\%$$
$$\text{ATR} = \boxed{15.62\%} \quad \text{Calc: } 15.66\%$$

a) What percent of people take less than 55 minutes to fill out the FAFSA?

$$z = 0.58$$
$$\text{ATL} = \boxed{71.90\%} \quad \text{Calc: } 71.82\%$$

a) What percent of people take between 30 and 40 minutes to fill out the FAFSA?

$$x = 30 \quad x = 40$$
$$z = -1.58 \quad z = -0.72$$
$$\text{ATL} = 5.71\% \quad \text{ATL} = 23.58\%$$
$$\boxed{17.87\%} \quad \text{Calc: } 17.98\%$$

d) Your BFF takes 25 minutes. What percentile is this?

$$z = -2.01$$
$$\text{ATL} = 2.22\%$$

2nd percentile

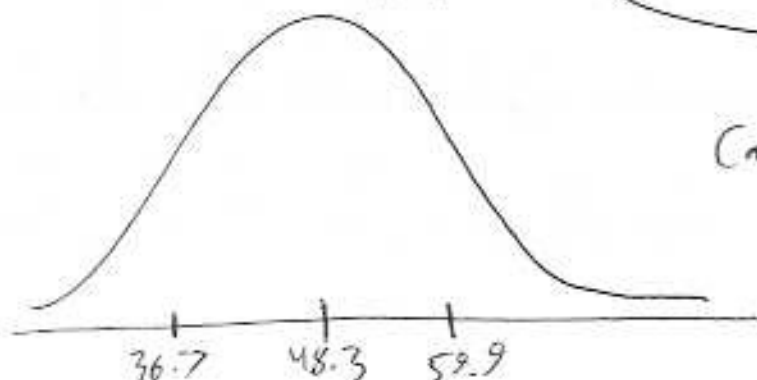
Calc: 2.23%

e) What is the 35th percentile for FAFSA time? Round to the nearest tenth.

$$z = -0.39 \text{ is closest}$$
$$-0.39 = \frac{x - 48.3}{11.6}$$

$x = 43.8$ minutes

Calc: 43.83



3) The following are the hours of sleep by a sample of CRC students on the night of February 20.

(25 points)

5.94 4.18 8.23 6.20 5.47 7.96 3.71 3.50 5.09 6.91
 4.05 6.93 5.59 6.39 6.24 4.78 6.90 7.29 6.21 8.54
 6.23 2.61 8.57 5.93 8.60 5.79 4.08 5.63

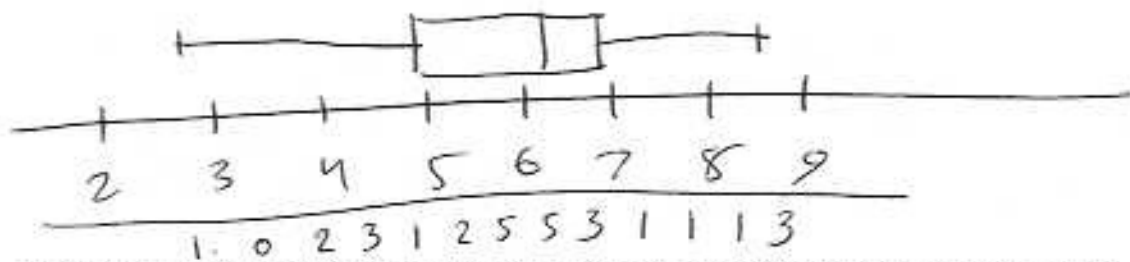
a) Find the mean and standard deviation amount of sleep.

$$\bar{x} = 5.98 \text{ hours}$$

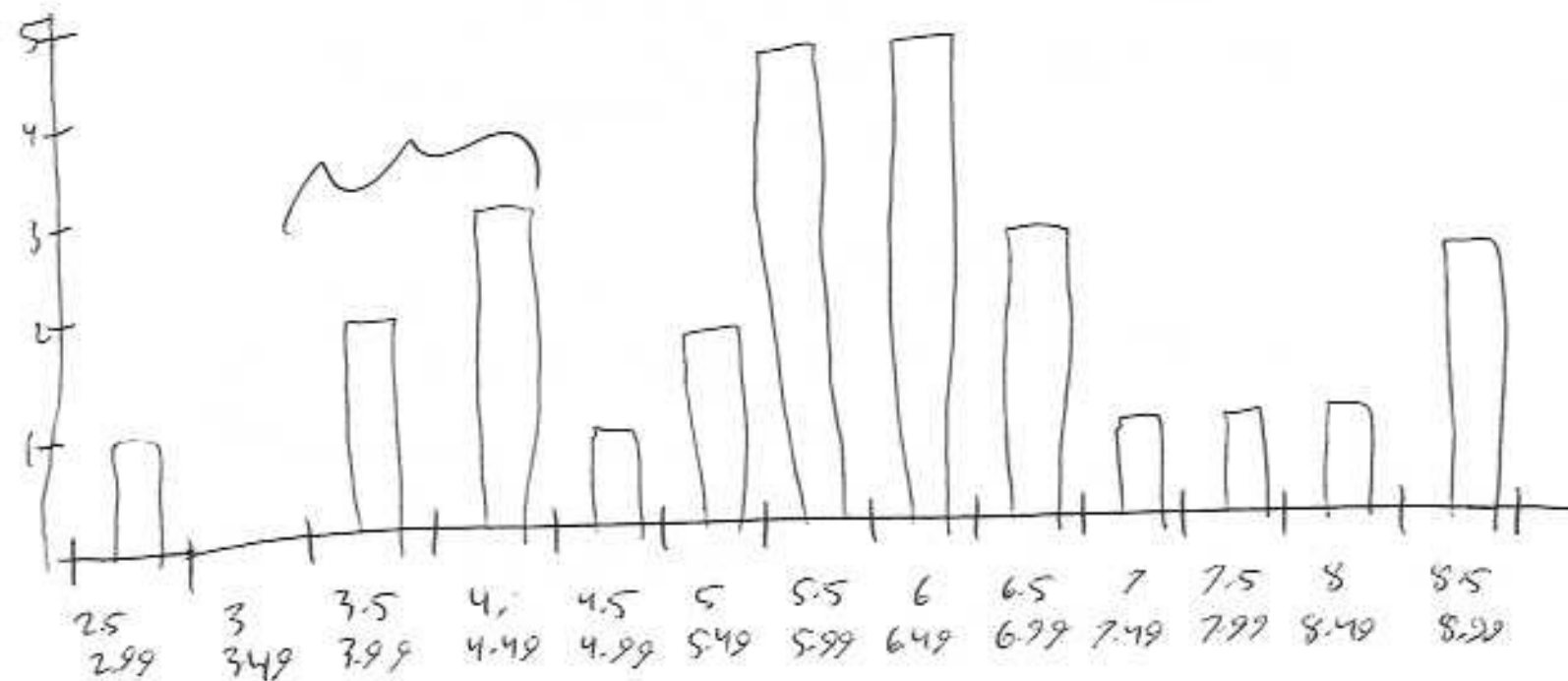
$$s = 1.61 \text{ hours}$$

b) Find the 5-number summary for amount of sleep. Write the 5 numbers and make a box-plot. Draw it to scale.

2.61 4.935 6.07 6.92 8.6



c) Make a histogram for hours of sleep. Use classes of equal width starting with 2.50-2.99, 3.00-3.49, 3.50-3.99, 4.00-4.49, etc. Make sure all the classes fit on this page.



Problem 3, continued

d) Find the z-score for the largest and smallest amount of sleep. Is either number an outlier, by the z-score definition of outlier?

$$2.61 : z = -2.09 \quad \text{low outlier}$$

$$8.6 : z = 1.63 \quad \text{no}$$

e) Describe the shape of the distribution. Justify your answer using evidence from parts (a)-(d).

Central peak 5.5 - 6.49

a little skewed left

mean is a little less than median

left tail goes a little longer

f) What fraction of students have an amount of sleep within one standard deviation of the mean?

$$4.37 \text{ to } 7.59$$

$$\frac{17}{28} = 61\%$$

4) The average weight of Jack Russell Terriers is 13.8 pounds, with a standard deviation of 2.1 pounds. The average weight of Golden Retrievers is 68.0 pounds, with a standard deviation of 11.2 pounds. Which dog is relatively larger compared to its breed, a 16-pound Jack Russell Terrier, or a 75-pound Golden Retriever? Justify your answer numerically.

(5 pts)

16 pound JRT

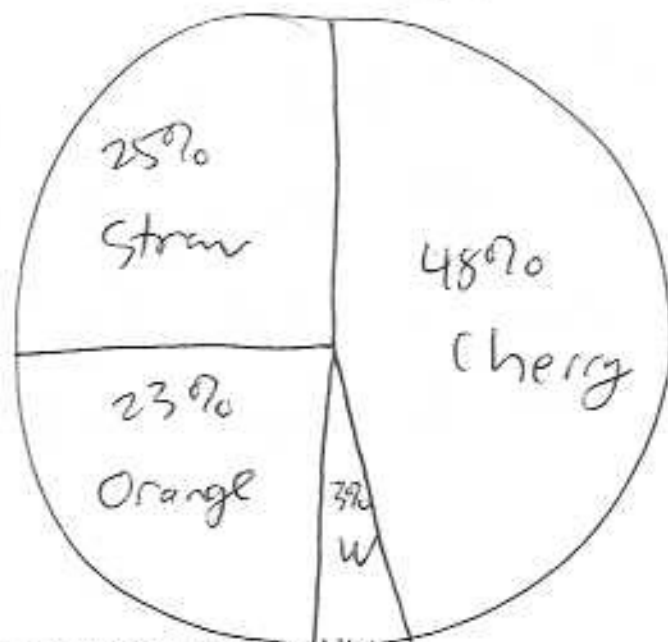
$$z = 1.05$$

75-pound GR

$$z = 0.625$$

5) Make a pie chart for the following data for favorite flavor of Starburst. (4 pts)

Cherry	59	48%
Orange	28	23%
Strawberry	31	25%
Watermelon	4	3%
	<hr/>	
	122	



6) Find the 85th percentile of the numbers in this sorted list.

(4 pts)

13 17 19 22 22 28 30 38 40 44
47 58 61 64 72 83 91 102 133 142

17th number

$$\frac{17}{20} = 85\%$$

7) You gather information for all of the counties in California. There are 58 counties in California, JSYK. (8 pts)

a) One variable for this data set is percent of registered voters in each county who are independent. Is this variable discrete or continuous? Justify.

continuous, the percent can be any decimal number

b) Another variable for this data set is number of cities in each county. Is this variable discrete or continuous? Justify.

discrete, whole numbers only

c) Is the 58 (see above) a variable? If yes, what kind. If no, what is it?

No it is the population size

d) You find that the average land area of each county is 2600 square miles. Is this number a variable? If yes, what kind. If no, what is it?

This is the population mean, a parameter

8) There are 8,300 people at a concert at the Golden One Center. You survey 20 of these music fans and find that 15 of them have seen the band in-person previously. How many of the 8,300 people have seen the band in-person previously?

(4 pts)

Probably about 6225

but we don't know the exact number