

Math 2200

Exam 1

Spring 2009

Put your answers of the answer card.

The answers offered have been rounded off; take that into account when looking for the correct answer.

1. Because of the difficulty of weighing a bear in the woods, researchers caught and measured 55 bears, recording their weight, neck size, length and sex.

How many "Who"s are in this data set?

How many of the variables considered are quantitative?

How many "What?" 's are answered in the data set?

- a. 5 "Who" 's, 3 quantitative variables, 220 "What?" 's answered.
 b. 55, 5, 60
 c. 5, 4, 110
 d. 110, 3, 55
 e. 55, 3, 220
 f. 51, 5, 55
 g. 55, 3, 55
 h. 5, 4, 220

Each bear is a "who"

the 3 underlined variables are quantitative

55 bears x 4 answers each = 220

2. Here is the survival data for people on the Titanic.

		Class				Total
		First	Second	Third	Crew	
Survival	Alive	203	118	178	212	711
	Dead	122	167	528	673	1490
	Total	325	285	706	885	2201

What percent of the survivors were Third Class passengers?

- a. 11%
 b. 15%
 c. 25%
 d. 34%
 e. 37%
 f. 40%
 g. 41%
 h. 44%

$$\frac{174}{711} = .25$$

3. Using the same data, what percentage of the people on the Titanic were first class passengers who died in the disaster?

- a. 2.1%
- b. 5.5%
- c. 9.3%
- d. 12.2%
- e. 15.9%
- f. 27.1%
- g. 31.8%
- h. 44.7%

$$\frac{122}{2201} = .0554$$

4. How many qualitative variables are presented in the data table the same below? (Note, the first column is the answer to "who?", not a variable.)

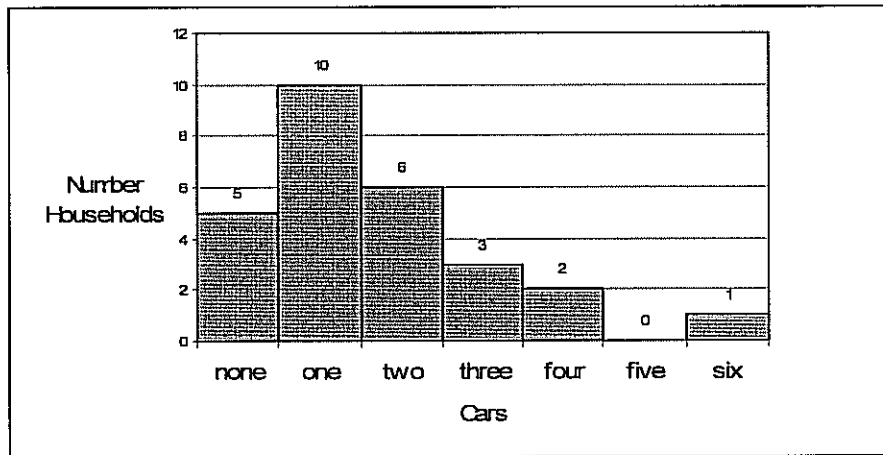
Name	Thread pitch (mm)	Minor diameter tolerance	Nominal diameter (mm)	Head shape	Price for 50 screws	Available at factory outlet?	Number in stock	Flat or Phillips head?
M4	0.7	4g	4	Pan	\$10.08	Yes	276	Flat
M5	0.8	4g	5	Round	\$13.89	Yes	183	Both
M6	1	5g	6	Button	\$10.42	Yes	1043	Flat
M8	1.25	5g	8	Pan	\$11.98	No	298	Phillips
M10	1.5	6g	10	Round	\$16.74	Yes	488	Phillips
M12	1.75	7g	12	Pan	\$18.26	No	998	Flat
M14	2	7g	14	Round	\$21.19	No	235	Phillips
M16	2	8g	16	Button	\$23.57	Yes	292	Both
M18	2.1	8g	18	Button	\$25.87	No	664	Both
M20	2.4	8g	20	Pan	\$29.09	Yes	486	Both
M24	2.55	9g	24	Round	\$33.01	Yes	982	Phillips
M28	2.7	10g	28	Button	\$35.66	No	1067	Phillips
M36	3.2	12g	36	Pan	\$41.32	No	434	Both
M50	4.5	15g	50	Pan	\$44.72	No	740	Flat



- a. 0
- b. 1
- c. 2
- d. 3
- e. 4
- f. 5
- g. 6
- h. 7

The following table and histogram present information about the number of cars owned by families in a certain neighborhood. It is used for the next 4 questions.

Number of cars owned	0	1	2	3	4	5	6
Households	5	10	6	3	2	0	1



7. Which of the following apply to the figure?

- 1—The distribution is skew.
- 2— The distribution is uniform
- 3— The distribution is symmetric
- 4—This is not a histogram, it is a bar chart and hence the first three statements can't possibly apply.

- a. None
- b. 1
- c. 2
- d. 3
- e. 4
- f. 1 and 2
- g. 1, 2, and 3
- h. All

8. What is the median number of cars owned?

- a. 0
- b. .5
- c. 1
- d. 1.33
- e. 1.5
- f. 1.67
- g. 2
- h. 2.5

*27 values
14th is median*

9. What is the IQR (interquartile range) of the number of cars owned?

- a. 0
 b. .5
 c. 1
 d. 1.33
 e. 1.5
 f. 1.75
 g. 2
 h. 2.25
- The scheme is described in the box on pg 58
- $Q_1 = \frac{1}{2} (7^{\text{th}} \text{ from bottom} + 8^{\text{th}} \text{ from bottom}) = 1$
- $Q_3 = 2$
- $IQR = Q_3 - Q_1 = 1$

(The book also mentions a variation on this. That variation gives the same answer.)

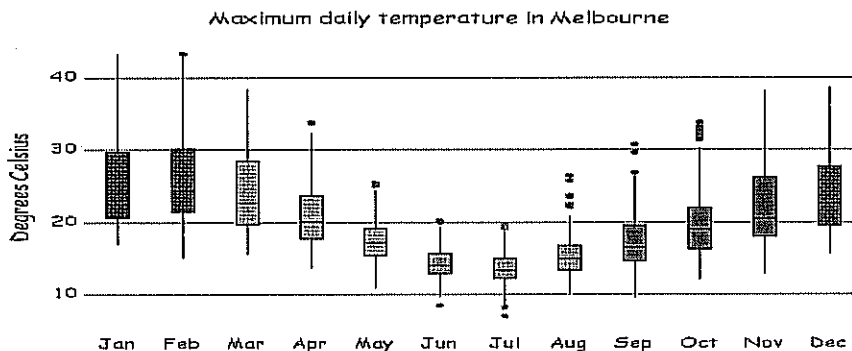
10. What is the mean number of cars owned by families?

- a. 1
 b. 1.25
 c. 1.33
 d. 1.5
 e. 1.67
 f. 1.75
 g. 2.0
 h. 2.25
- $\frac{1}{27} (5 \cdot 0 + 10 \cdot 1 + 6 \cdot 2 + 3 \cdot 3 + 2 \cdot 4 + 0 \cdot 5 + 1 \cdot 6)$
- $= \frac{1}{27} 45 = \frac{5}{3} = 1\frac{2}{3} = 1.67$

11. What is the variance, S^2 , of the number of cars owned?

- a. 1.78
 b. 1.88
 c. 1.98
 d. 2.08
 e. 2.18
 f. 2.28
 g. 2.38
 h. 2.48
- $\frac{1}{26} \left\{ 5 \left(0 - \frac{5}{3}\right)^2 + 10 \left(1 - \frac{5}{3}\right)^2 + 6 \left(2 - \frac{5}{3}\right)^2 \right.$
- $\left. + 3 \left(3 - \frac{5}{3}\right)^2 + 2 \left(4 - \frac{5}{3}\right)^2 + \left(6 - \frac{5}{3}\right)^2 \right\}$
- $= 2.077$

12. The figure below contains 12 boxplots, one for each month, summarizing the daily high temperature in Melbourne Australia in the years 1981-1990. The temperatures are in Celsius; 10° Celsius = 50° Fahrenheit; 40° Celsius = 104° Fahrenheit.

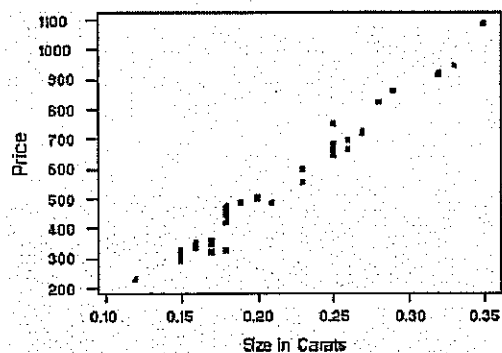


Which of the following statements seem to be supported by the data?

- 1—July is the coolest month.
- 2—There is more variability of temperature in January and February than in June and July.
- 3—Their summer, Dec. to Feb., is about 10° Celsius warmer than their winter, June to Aug.

- a. None
- b. 1
- c. 2
- d. 3
- e. 1 and 2
- f. 1 and 3
- g. 2 and 3
- h. All

13. This scatterplot displays the association between the size of a diamond (in carats) and its retail price (in Singapore dollars) for 48 observations.



Which of the following statements appear correct?

- 1—There appears to be an association between the size of the diamond and the price.
- 2—The association is positive.
- 3—The association is strong.
- 4—The association is approximately linear.

- a. None
- b. 1
- c. 2
- d. 3
- e. 1 and 3
- f. 1, 2 and 3
- g. 3 and 4
- h. All

14. If we were to redo the analysis of the data in the previous question but measuring the size of diamonds in grams and the price in US dollars, which of the following would change?

- 1—The strength of the association
- 2—The form of the association
- 3—The direction of the association
- 4—The correlation coefficient

- a. None
- b. 3
- c. 4
- d. 1 and 2
- e. 1 and 3
- f. 2 and 3
- g. 3 and 4
- h. All

15. The mean score on a physics exam is 72 and the standard deviation is 6. What is the z-score of a student who had a grade of 85?

- a. 2.02
- b. 2.07
- c. 2.12
- d. 2.17**
- e. 2.22
- f. 2.27
- g. 2.32
- h. 2.47

$$z = \frac{85 - 72}{6} = \frac{13}{6} = 2.167$$

16. Wildlife biologists believe that the weights of adult trout can be described by a Normal model. They collect data from fisherman, finding that 22% of the trout caught were thrown back because they were below the 2-pound minimum, and only 6% were over 5 pounds. What mean and standard deviation should define the model?

- a. Mean 2.5 lb, SD 1.3 lb
- b. Mean 2.8 lb, SD 1.3 lb
- c. Mean 3.0 lb, SD 1.3 lb**
- d. Mean 3.2 lb, SD 1.5 lb
- e. Mean 3.1 lb, SD 1.6 lb
- f. Mean 3.3 lb, SD 1.7 lb
- g. Mean 3.4 lb, SD 1.8 lb
- h. Mean 3.5 lb, SD 1.9 lb

① 22% → z = -0.77, 94% → z = 1.55

② $\frac{2 - \mu}{\sigma} = -0.77$ $\frac{5 - \mu}{\sigma} = 1.55$

③ multiply by σ in both equations, subtract equations
 $-3 = -2.32\sigma$ $\sigma = 1.293 \sim 1.3$

④ back to earlier equations
 $\mu = 2 + 0.77\sigma = 2 + 0.77(1.3) = 3.0$

17. Accepting that N(1152,84) is the Normal model for the weight of Angus steers, what percent of steers weigh between 1000 and 1100 pounds?

- a. 20.0%
- b. 21.1%
- c. 22.2%
- d. 23.3%**
- e. 24.4%
- f. 25.5%
- g. 26.6%
- h. 27.7%

$\frac{1000 - 1152}{84}$ $\frac{11}{84}$ -1.81 $\frac{11}{84}$ z \downarrow <p>3.5% below</p>	44 $\frac{1100 - 1152}{84}$ $\frac{11}{84}$ -0.62 $\frac{11}{84}$ z \downarrow <p>26.8% below</p>
$26.8 - 3.5 = 23.3\% \text{ between}$	

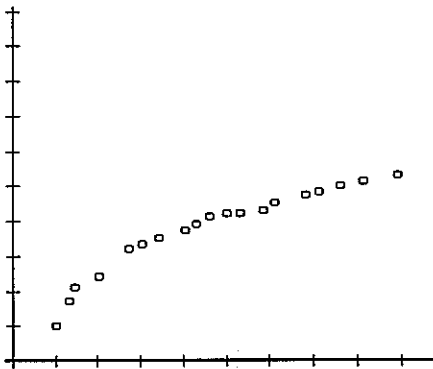
18. Compute the correlation coefficient for the following set of data

Cost of burger (cents)	97	147	198	225
oz. of meat	2	2.4	4	4.2

- a. .997
- b. .987
- c. .977
- d. .967
- e. .957
- f. .947
- g. .937
- h. .927

* 96711

19. Which statements about the associated scatter appear to be correct?



- 1—There is a strong association between the variables.
- 2—The direction of the association is positive
- 3—The correlation coefficient for the data is positive.
- 4—The association appears to be linear.

- a. None
- b. 1 and 2
- c. 2 and 3
- d. 1 and 3
- e. 1, 2, and 3
- f. 2, 3, and 4
- g. 1, 3, and 4
- h. All