

“PRACTICE TEST”

Coverage: PSLs/2e Chapters 1 – 3 (Your text covers up to Ch 4)

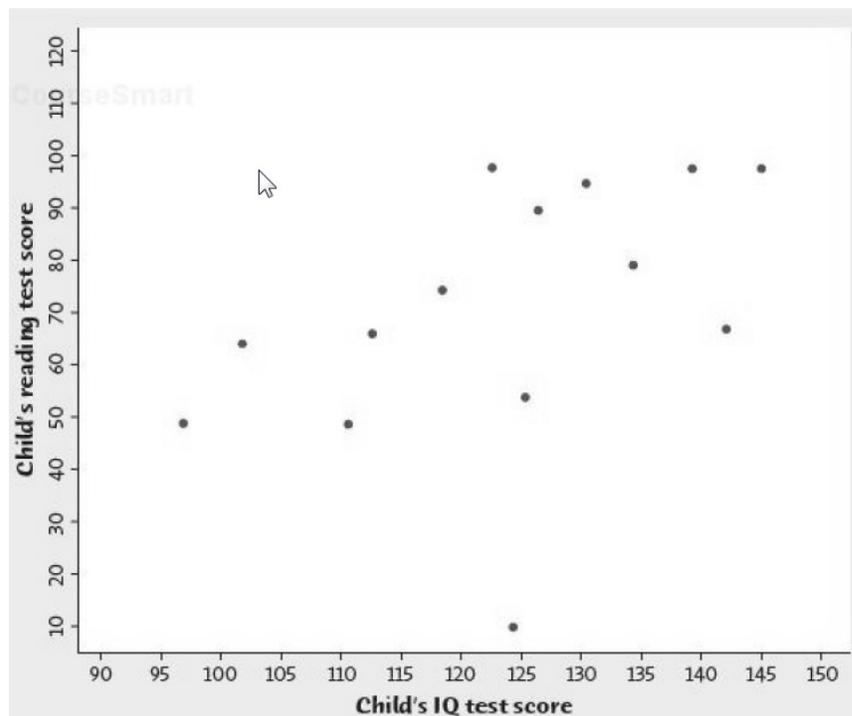
Instructions: This is a closed-book exam. FORMULAS and TABLES are provided. Calculator use is encouraged. All items are worth 1 point [unless otherwise specified]. Answer in the space provided. **Time limit: 1¼ hour.**

1. A magazine ranks colleges on their academic quality. Below are several variables that contribute to the ranking. Identify the measurement scale of each variable as either categorical or quantitative.

Var Name	Variable Description {codes: possible values}	Var Scale (fill in)
COLTYPE	College type {1 = liberal arts, 2 = comprehensive university, 3 = research university, 4 = other}	
SAT_ACT	College admission test (SAT or ACT) for admission: {1 = required, 2 = recommended, 3 = not used}	
AVG_SAT	Average SAT or ACT score of incoming freshman {standardized SAT or ACT score}	
FAC_SAL	Mean faculty salary {dollars per month}	

2. **Multiple choice questions/circle best response.** The Figure just below this question is a scatterplot of reading test scores against IQ test scores. There is one low outlier in the plot. The value of this outlier is:

- (a) IQ = 10, reading = 124 (b) IQ = 124, reading = 72 (c) IQ = 124, reading = 10



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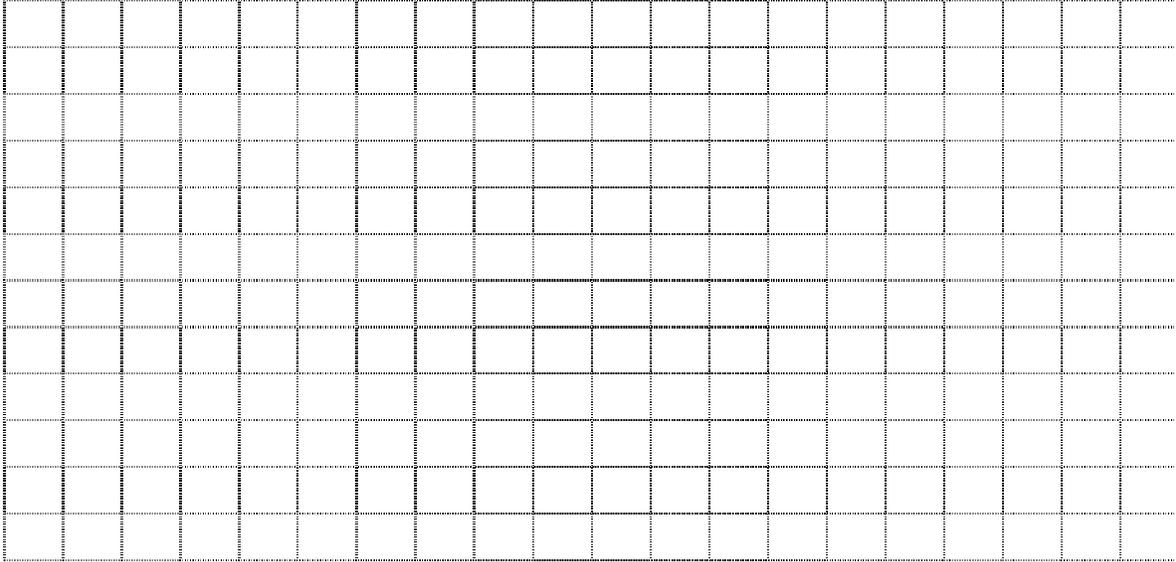
3. If we remove the low outlier from the prior figure, the correlation for the remaining 13 points is close to
- (a) 0.5 (b) -0.5 (c) 0.96
4. What possible values can a correlation coefficient r take?
- (a) $r \geq 0$ (b) $0 \leq r \leq 1$ (c) $-1 \leq r \leq 1$
5. If the correlation between two variables is close to 0, you can conclude that the scatterplot would show
- (a) a cloud of points with no clear trend or pattern
(b) a cloud of points with a detectable upward sloping linear pattern
(c) a cloud of points with a detectable downward sloping linear pattern
6. What is the preferred measure of central location when describing a symmetrical distribution?
- (a) mean (b) median (c) standard deviation (d) IQR
7. What is the preferred measure of spread when describing an asymmetrical distribution?
- (a) mean (b) median (c) standard deviation (d) IQR
8. The mean of a data set is 90. It's median is 82. What does this indicate about the shape of the distribution?
- (a) it's symmetrical (b) it's skewed right (c) it's skewed left
9. What possible values can a standard deviation (s) possibly take?
- (a) $s \geq 0$ (b) $0 \leq s \leq 1$ (c) $-1 \leq s \leq 1$
10. If wives were *always* 3 years younger than their husbands, the correlation r would be:
- (a) 1. (b) 0.5. (c) Can't tell without seeing the data
11. What percentage of observations in a distribution lie between the first quartile and third quartile?
- (a) 25% (b) 50% (c) 75%

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12. A data set ($n = 16$) of health care expenditures (in dollars) is listed here. [10 points]

1280	1340	1770	1910	1940	2070	2220	2350
2410	2590	2840	2960	3000	3190	3860	5220

(a) Plot the data as a stemplot with *split stem* values. [4 pts]



(b) Describe the shape of the distribution.

(c) Identify outliers, if any. If you think there are no outliers, say “none.”

(d) Identify the middle value (median) of the distribution.

(e) Describe the spread of the distribution.

(f) Determine the quartiles (Q_1 and Q_3) of the distribution. [2 pts]

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13. Counts of colony forming fungus, bacterial, and pollen spores per cubic meter of air in a surgical suite on three successive days are {12 , 24, 30}. *Show all work.*

(a) Calculate \bar{x} .

(b) Calculate the deviations, squared deviations, and sum of squares for these data by hand in a step-by-step fashion in tabular form as you had done for homework. [3 pts]

(c) Calculate variance s^2 .

(d) Calculate standard deviation s .

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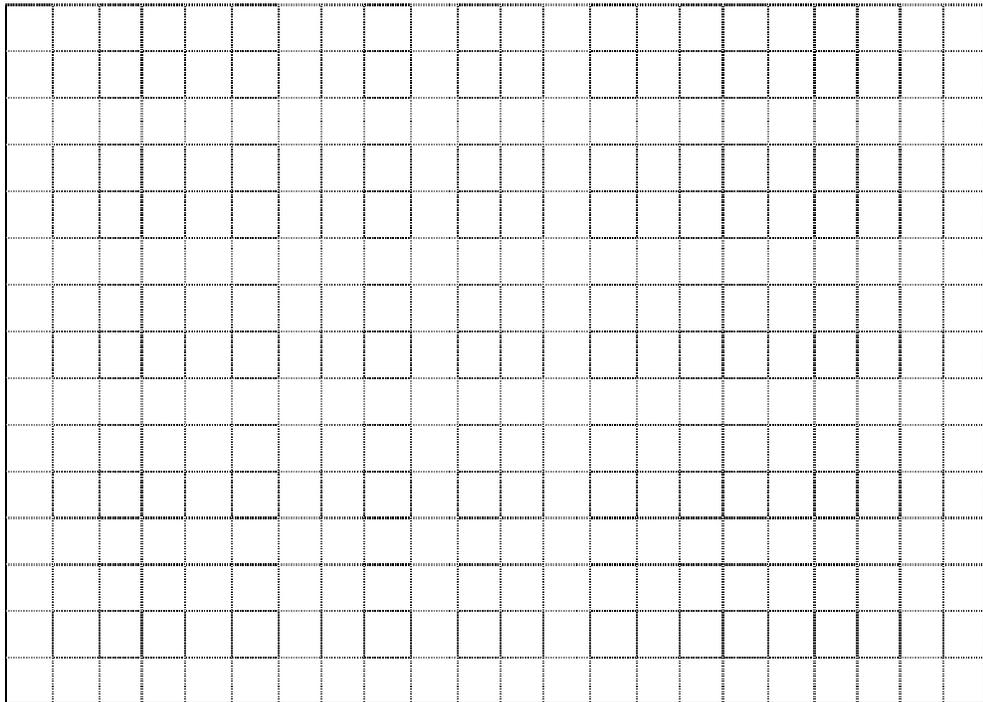
14. We want to look at how body MASS affects ENERGY consumption. Data for 6 individuals for lean body MASS (kilograms leaving out fat) and ENERGY expended (kilojoules per minute) are:

MASS	ENERGY
7.9	0.93
9.4	1.39
10.7	1.19
12.2	1.49
12.1	1.29
10.8	1.31

(a) What is the *name* of the explanatory variable in this analysis?

(b) What is the *name* of the response variable?

(c) Plot the data. [3 pts]



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(d) Describe the form and direction of the relationship. [2 pts]

(e) Use your calculator to derive correlation coefficient r .

$r =$

(f) Characterize the strength of the relationship.

(g) Use your calculator to derive the mean and standard deviation for each of the variables (i.e., $\bar{x}, s_x, \bar{y}, s_y$). [2 pts]

$\bar{x} =$ _____

$s_x =$ _____

$\bar{y} =$ _____

$s_y =$ _____

(h) Calculate the correlation coefficient by hand using our step-by-step approach.

i	MASS	ENERGY	Z_x	Z_y	$Z_x \cdot Z_y$
1	7.9	0.93			
2	9.4	1.39			
3	10.7	1.19			
4	12.2	1.49			
5	12.1	1.29			
6	10.8	1.31			

$r =$