

Name: _____

PSY 216: Elementary Statistics
Exam 2

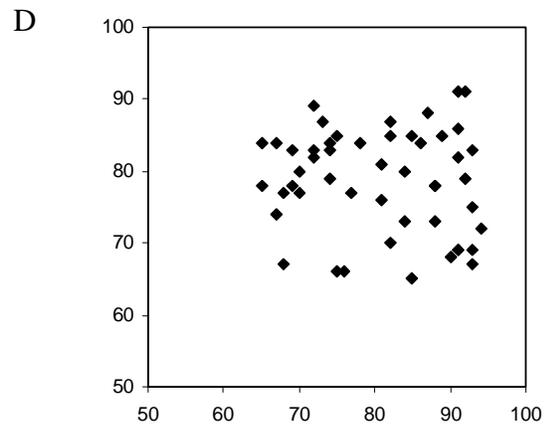
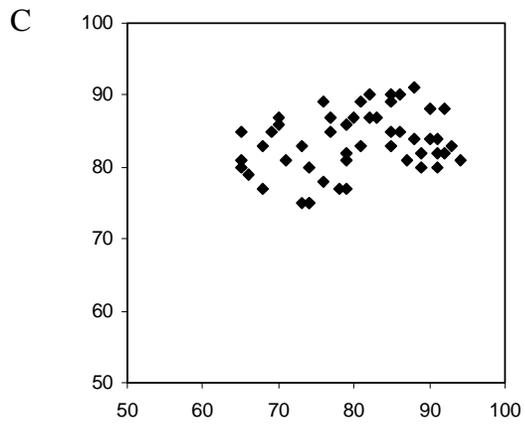
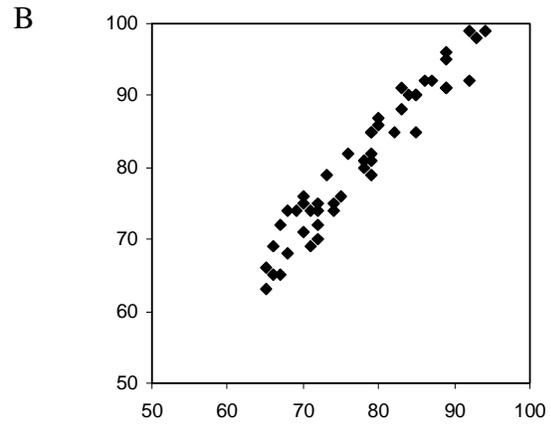
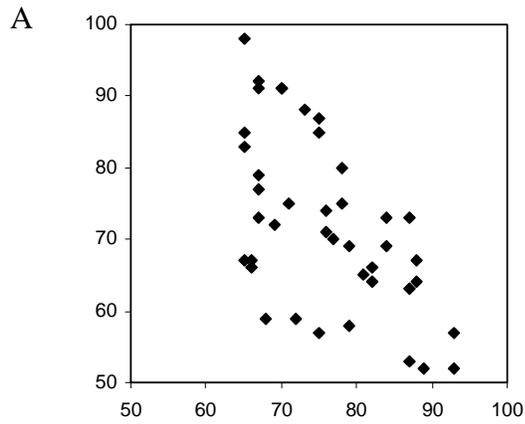
This exam consists of 25 multiple-choice questions and 5 essay / problem questions. For each multiple-choice question, circle the one letter that corresponds to the correct answer. Each multiple-choice question is worth 2 points. If you do not show your work in the essay / problem questions, you cannot receive partial credit. Each of the essay / problem questions is worth 10 points. You have until 10:50 AM to finish the exam. Budget your time wisely.

1. If two variables are correlated then
 - A. $r > 1.0$
 - B. $|r| > 1.0$
 - C. knowing the value of one of the variables allows you to predict the value of the other variable.
 - D. All of the above.

2. What is the Pearson's product moment correlation coefficient for the following two variables? Number of correct answers on exam 2 and the number of incorrect answers on exam 2.
 - A. +1.0
 - B. -1.0
 - C. 0
 - D. You cannot determine the correlation coefficient from the information given.

3. If as the number of older brothers and sisters that a person has increases, the level of extraversion also increases, then these two variables have
 - A. a positive correlation.
 - B. a negative correlation.
 - C. a zero correlation.
 - D. either a positive or negative correlation depending on how strongly they are related to each other.

4. Which of the following correlation coefficients show the strongest relation?
 - A. $r = -0.74$
 - B. $r = -0.12$
 - C. $r = 0.63$
 - D. $r = 2.97$



5. Which of the scatter plots shown above has the r with the greatest magnitude?

- A. A
- B. B
- C. C
- D. D

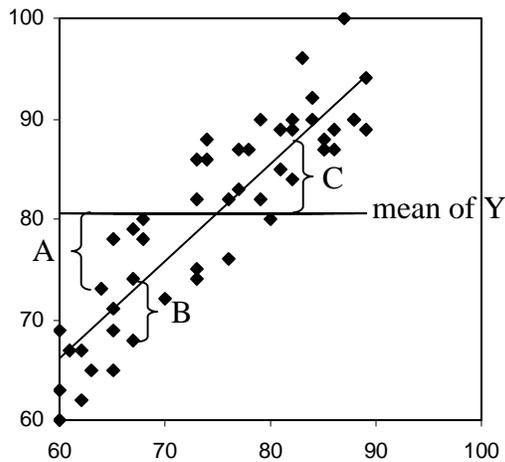
6. Which of the scatter plots shown above has the r with the smallest magnitude?

- A. A
- B. B
- C. C
- D. D

7. Which of the scatter plots shown above has the r that is negative?

- A. A
- B. B
- C. C
- D. D

8. You took a standardized personality test. You received a score of 18 on the extraversion scale and a score of 15 on the conscientiousness scale. The mean of both scales is 10. The standard deviation of the extraversion scale is 2 and the standard deviation of the conscientiousness scale is 1. Which of the following statements is correct?
- You are more extraverted than conscientious (because $18 > 15$).
 - You are more extraverted than conscientious (because the z score for extraversion is larger than the z score for conscientiousness).
 - You are more conscientious than extraverted (because the z score for conscientiousness is larger than the z score for extraversion.)
 - You are as conscientious as you are extraverted (because the z score for conscientiousness is equal to the z score for extraversion).
9. Which of the following sets of properties of z scores is true?
- $\bar{z} = 1, s_z = 0, \sum z^2 = N$
 - $\bar{z} = N, s_z = 0, \sum z^2 = 1$
 - $\bar{z} = 0, s_z = 1, \sum z^2 = N$
 - $\bar{z} = N, s_z = 1, \sum z^2 = 0$
10. The coefficient of determination
- is a measure of how accurate our predictions will be.
 - is the proportion of variation in one variable that is explainable by variation in the other variable.
 - plus the coefficient of non-determination must equal 1.
 - All of the above.
11. A researcher sent a questionnaire to a random sample of senior citizens. The results indicated that the more grandchildren that the senior citizens had, the greater their satisfaction with life. We can conclude that
- having grandchildren causes senior citizens to be satisfied with life.
 - being satisfied with life causes senior citizens to have grandchildren.
 - having a lot of money causes senior citizens to be satisfied with life and allows them to have more children, which in turn allows them to have more grandchildren.
 - having grandchildren is related to satisfaction with life, but may not cause it.
12. Which of the following statements about level of measurement and Pearson's product moment correlation coefficient is correct?
- Pearson's r can safely be used with any of the levels of measurement.
 - Pearson's r can safely be used only with nominally scaled variables.
 - Pearson's r can safely be used only when at least one, but not necessarily both, of the variables are nominally scaled.
 - Pearson's r can safely be used only when both variables have at least an interval level of measurement.



13. In the above diagram, which of the distances, if any, is associated with the total variation in the Y variable?
- A
 - B
 - C
 - None of the distances are associated with the total variation in the Y variable.
14. In the diagram above question 13, which of the distances, if any, is associated with the variation in Y that is explainable by variation in X?
- A
 - B
 - C
 - None of the distances are associated with the variation in Y that is explainable by variation in X.
15. In the diagram above question 13, which of the distances, if any, is associated with the variation in Y that is not explainable by variation in X?
- A
 - B
 - C
 - None of the distances are associated with the variation in Y that is not explainable by variation in X.
16. The quizzes in this class are each worth 10 points. The exams in this class are each worth 100 points. There is a substantial, positive correlation between the quiz grade and the exam grade. What can you predict about the slope of the regression line for predicting an exam score given a quiz score? (Hint: Think about what is likely to be true about the standard deviation of a quiz score relative to the standard deviation of an exam score.)
- The slope will be large and positive.
 - The slope will be small and positive.
 - The slope will be large and negative.
 - The slope will be small and negative.

17. If the slope of the regression line predicting Y given X is 2 and the intercept of the regression line is 5, what is the predicted value of Y when X equals 10?
- The mean of Y.
 - 0
 - 25
 - 52
18. If the number of letters in people's last name is *not* correlated with your GPA, what is the regression equation that predicts people's GPA given the number of letters in people's last name.
- $\text{GPA}' = \text{mean GPA}$
 - $\text{GPA}' = \text{mean number of letters in people's last name}$
 - $\text{GPA}' = \text{mean GPA} + \text{mean number of letters in people's last name}$
 - There is insufficient information to answer the question.
19. A questionnaire asks people what their college major is and whether they have a job or not. Which of the following expressions is correct for determining the probability of being a psychology major or having a job?
- $p(\text{psych major or job}) = p(\text{psych major}) * p(\text{job})$
 - $p(\text{psych major or job}) = p(\text{psych major}) + p(\text{job})$
 - $p(\text{psych major or job}) = p(\text{psych major}) + p(\text{job}) - p(\text{psych major and job})$
 - $p(\text{psych major or job}) = p(\text{psych major}) + p(\text{job}) + p(\text{psych major and job})$

	Likes Psychology	Dislikes Psychology
Likes Math	5	10
Dislikes Math	15	5

20. For the table shown above, which of the following statements is true?
- The *joint* probability of liking both psychology and math is $(5 + 10 + 15) / 35$.
 - The *joint* probability of liking both psychology and math is $(5 + 10) / 35$.
 - The *marginal* probability of liking psychology is $(5 + 10) / 35$.
 - The *marginal* probability of liking psychology is $(5 + 15) / 35$.
21. Which of the following is the correct formula for determining the conditional probability of being a psychology major given that you are female.
- $p(\text{psychology major} | \text{female}) = p(\text{psychology major and female}) / p(\text{female})$
 - $p(\text{psychology major} | \text{female}) = p(\text{psychology major and female}) / p(\text{psychology major})$
 - $p(\text{psychology major} | \text{female}) = p(\text{psychology major}) * p(\text{female})$
 - $p(\text{psychology major} | \text{female}) = p(\text{psychology major}) + p(\text{female})$

22. Why does the addition rule for non-mutually exclusive events include the $p(A \text{ and } B)$ term?
- A. The events that are both A and B are counted twice when they are summed. By subtracting $p(A \text{ and } B)$, we remove the second counting.
 - B. We are only interested in $p(A \text{ or } B)$ and not $p(A \text{ and } B)$. Therefore, we subtract $p(A \text{ and } B)$ to get rid of those events.
 - C. $p(A \text{ and } B)$ is the multiplication rule and this is the addition rule.
 - D. All of the above.
23. Covariance
- A. is the extent to which two variables share common variance.
 - B. should be equal to 1 when there is no relation between the two variables.
 - C. should be small when the two variables are related to each other.
 - D. All of the above.
24. You took the Graduate Record Exam (a test to get into graduate school) and scored at the 95th percentile. What is likely to happen to your score if you re-take the exam?
- A. It is likely to remain the same, or very close to the same.
 - B. It is likely to increase because of regression to the mean.
 - C. It is likely to decrease because of regression to the mean.
 - D. Either answer B or C depending on the correlation coefficient.
25. You toss a fair coin 10 times and each time it comes up heads. What is the probability that it will come up heads on the 11th toss?
- A. 0.5
 - B. Less than 0.5 because the coin is overdue for tails.
 - C. Greater than 0.5 because a fair coin couldn't come up heads 10 times in a row.
 - D. This question only has three responses! Don't select this one!

26. Name three assumptions that Pearson's product moment correlation coefficient makes. What are the consequences of violating those assumptions?

27. Give the formula for a z score. What purpose do z scores serve?

28. For the following data, calculate the regression equation predicting how much you like cats given how much you like children. Show your work.

Like Cats	$Z_{\text{Like Cats}}$	Like Children	$Z_{\text{Like Children}}$	$Z_{\text{Cats}} \times Z_{\text{Children}}$
5	0.807573	7	1.470358	1.187422
4	0.269191	5	0.456318	0.122837
4	0.269191	6	0.963338	0.259322
2	-0.80757	5	0.456318	-0.36851
4	0.269191	3	-0.55772	-0.15013
1	-1.34595	1	-1.57176	2.115521
5	0.807573	4	-0.0507	-0.04095
1	-1.34595	1	-1.57176	2.115521
2	-0.80757	3	-0.55772	0.450401
7	1.884337	6	0.963338	1.815254
Σ	35		41	7.506688
mean	3.5		4.1	0.7506688
s	1.857418		1.972308	

29. Answer each of the following probability questions. Partial credit may be given if you show your work.

A. You roll two dice. What is the probability that the sum is 7?

B. You draw four cards from a standard deck without replacement. What is the probability that they are *not* four of a kind?

C. The mean height of Martians is 35" with a standard deviation of 5". Consult the attached table of areas under the unit normal curve to determine the probability of encountering a randomly selected Martian who is at least 27.5" tall? (Assume that Martians do exist! The answer is not 0.)

Areas Under the Unit Normal Distribution

z	Area below	Area above	z	Area below	Area above
-2.00	0.023	0.977	0.05	0.520	0.480
-1.95	0.026	0.974	0.10	0.540	0.460
-1.90	0.029	0.971	0.15	0.560	0.440
-1.85	0.032	0.968	0.20	0.579	0.421
-1.80	0.036	0.964	0.25	0.599	0.401
-1.75	0.040	0.960	0.30	0.618	0.382
-1.70	0.045	0.955	0.35	0.637	0.363
-1.65	0.049	0.951	0.40	0.655	0.345
-1.60	0.055	0.945	0.45	0.674	0.326
-1.55	0.061	0.939	0.50	0.691	0.309
-1.50	0.067	0.933	0.55	0.709	0.291
-1.45	0.074	0.926	0.60	0.726	0.274
-1.40	0.081	0.919	0.65	0.742	0.258
-1.35	0.089	0.911	0.70	0.758	0.242
-1.30	0.097	0.903	0.75	0.773	0.227
-1.25	0.106	0.894	0.80	0.788	0.212
-1.20	0.115	0.885	0.85	0.802	0.198
-1.15	0.125	0.875	0.90	0.816	0.184
-1.10	0.136	0.864	0.95	0.829	0.171
-1.05	0.147	0.853	1.00	0.841	0.159
-1.00	0.159	0.841	1.05	0.853	0.147
-0.95	0.171	0.829	1.10	0.864	0.136
-0.90	0.184	0.816	1.15	0.875	0.125
-0.85	0.198	0.802	1.20	0.885	0.115
-0.80	0.212	0.788	1.25	0.894	0.106
-0.75	0.227	0.773	1.30	0.903	0.097
-0.70	0.242	0.758	1.35	0.911	0.089
-0.65	0.258	0.742	1.40	0.919	0.081
-0.60	0.274	0.726	1.45	0.926	0.074
-0.55	0.291	0.709	1.50	0.933	0.067
-0.50	0.309	0.691	1.55	0.939	0.061
-0.45	0.326	0.674	1.60	0.945	0.055
-0.40	0.345	0.655	1.65	0.951	0.049
-0.35	0.363	0.637	1.70	0.955	0.045
-0.30	0.382	0.618	1.75	0.960	0.040
-0.25	0.401	0.599	1.80	0.964	0.036
-0.20	0.421	0.579	1.85	0.968	0.032
-0.15	0.440	0.560	1.90	0.971	0.029
-0.10	0.460	0.540	1.95	0.974	0.026
-0.05	0.480	0.520	2.00	0.977	0.023
0.00	0.500	0.500			

Name: _____

30. **Remove this page from your test and turn in the rest of the test before answering this question. You may not have the rest of your test back once it has been turned in. You may use whatever resources *you* have (including the web) to answer this, and only this, question. Failure to turn in the rest of the test prior to working on this question will automatically result in a score of 0 on the test.**

Start SPSS and load the standard class data set (you can get the standard class data set from the web.) Write the linear regression equation predicting *friends* (I would rather stay at home and read than go out with my friends) from *extravert* (I am an extravert). Be sure to do the things that you should do *before* you perform regression. Print your SPSS output, put your name on it and turn it in with this question.