

**Problem 1.** Consider two variables  $x$  and  $y$  both with average 0 and SD 1. If the RMS error for the regression of  $y$  on  $x$  is zero, then the correlation coefficient is:

- A. 0
- B. cannot be determined from the information given
- C. +1
- D. Either +1 or -1
- E. -1

*Answer:*

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**Problem 2.**

As you move from point A to point B in Figure 1, your  $x$ -coordinate goes up by —; your  $y$ -coordinate goes up by —.

- A.  $x$  down by 2,  $y$  up by 3
- B.  $x$  up by 2,  $y$  down by 3
- C.  $x$  up by 3,  $y$  up by 3
- D.  $x$  up by 3,  $y$  up by 2
- E.  $x$  up by 2,  $y$  up by 3

*Answer:*

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**Problem 3.**

Which correlation is higher? Height at age 4 and 24, height at age 12 and 17, height at age 5 and 8, height at age 16 and 18.

- A. can not tell
- B. height at age 4 and 24
- C. height at age 12 and 17
- D. height at age 5 and 8
- E. height at age 16 and 18

*Answer:*

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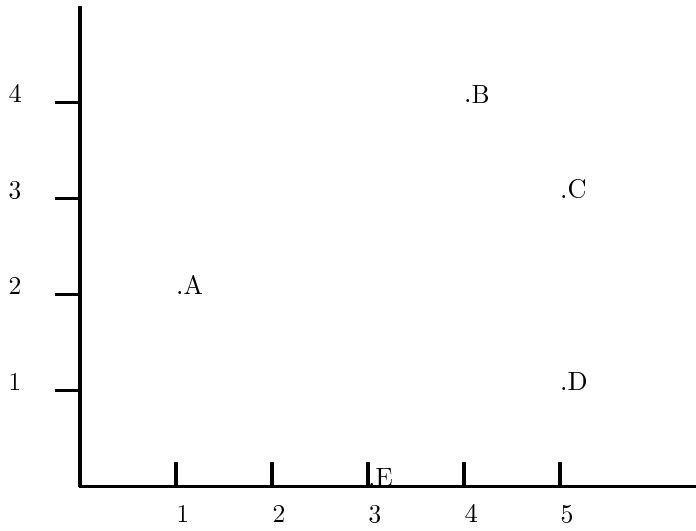


Figure 1:

**Problem 4.**

For the data shown below, calculate the correlation coefficient.



Age	Percent of population
1	5
1	3
1	5
1	7
2	3
2	3
2	1
3	1
3	1
4	1

- A. -0.8  
 B. 0.80  
 C. 1.5  
 D. .05  
 E. -1.5

Answer:

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**Problem 5.**

In a large statistics class, the correlation between midterm scores and final scores is found to be nearly 0.50, every term. The scatter diagrams are football-shaped. Predict the percentile rank on the final for a student whose percentile rank on the midterm is 50%

- A. 50%
- B. 45%
- C. can not tell
- D. 40%
- E. 60%

*Answer:*

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**Problem 6.**

The regression fallacy consists in thinking that the regression effect must be due to:

- A. something other than the spread about the SD line
- B. a foot-ball shaped scatter plot
- C. a non foot-ball shaped scatter plot
- D.  $r$  being close to zero
- E. the correlation coefficient being different from 0

*Answer:*

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**Problem 7.**

Would the correlation between the weight and miles per gallon be positive or negative? Why?

- A. negative. The heavier the car, the more efficient
- B. not enough information given
- C. positive. The heavier the car, the less efficient
- D. negative. The heavier the car, the less efficient
- E. positive. The heavier the car, the more efficient

*Answer:*

**Problem 8.**

The regression line of  $y$  on  $x$  is used for: (choose the most correct)



- A. to predict  $x$  for each  $y$
- B. to estimate the average value of  $y$  for each value of  $x$
- C. to learn about  $y$  from  $x$
- D. to find out what  $y$  is for a given  $x$
- E. to find out the value of the correlation coefficient

*Answer:*

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**Problem 9.**

Consider the following 4 statements:



1.  $r$  describes the clustering of the scatter diagram around the SD line, relative to the SDs
2. associated with each one-SD increase in  $x$  there is an increase of only  $r$  SDs in  $y$ , on the average
3.  $r$  determines the accuracy of the regression estimates through the formula for r.m.s. error.
4.  $r$  tells what proportion of the points on the scatter diagram are highly correlated

Of these four statements,

- A. none are true.
- B. all four are true
- C. exactly three are true
- D. exactly two are true
- E. exactly one is true

*Answer:*

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**Problem 10.**

Two different investigators are working on a growth study. The first measures the heights of 100 children in inches. The second prefers the metric system, and changes the results to centimeters (multiplying by the conversion factor 2.54 centimeter per inch). If no mistakes are made in the conversion, what is the correlation between the two sets of measurements?

- A. 2
- B. -1
- C. 1
- D. can't tell
- E. 0

Answer:



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**Problem 11.** The data below compares hours of sleep to grades in school.

Ave hours of sleep = 8      SD= 0.8  
Ave G.P.A. = 2.7      SD= 0.4  
r=0.48

People who sleep 7 hours will have an average G.P.A. of ... ?

- A. 2.94
- B. 0.24
- C. 3.42
- D. 4.0
- E. 2.46

Answer:



**Problem 12.**

The freshmen at a large university are required to take a battery of aptitude tests. Students who score high on the mathematics test also tend to score high on the physics test. On both tests, the average score is 60, with an SD of 20. (the scatter diagram is football-shaped.) Consider only the students who scored about 80 on the mathematics test. Then, which of the following alternatives is most correct?

- A. the average of their scores on the physics test is over 80
- B. less than half scored over 80 on the physics test
- C. can't tell
- D. the average of their scores on the physics test is less than 80
- E. just about half scored over 80 on the physics test

*Answer:*



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**Problem 13.**

The average height of husbands in a survey was 68 inches with an SD of 2.8 inches. Their wives had an average height of 64 inches with and SD of 2.8 inches. There was a correlation of 0.6 between the heights of the husbands and those of the wives. The husbands who are 66 inches tall have wives whose average height are closest to

- A. 65.8 inches
- B. 62.8 inches
- C. 65 inches
- D. 60.5 inches
- E. 64.8 inches

*Answer:*



**Problem 14.**

When the correlation coefficient between  $X$  and  $Y$  is negative, then:

- A. when  $X$  is positive  $Y$  tends to be negative
- B. when  $X$  is below its average,  $Y$  tends to be above its average
- C. The farther away  $X$  is from its average the closer  $Y$  is from its own average
- D. none of these choices
- E. when  $X$  is negative in standard units, then  $Y$  tends to be below its average

Answer:

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**Problem 15.**

When  $r$  is not zero, then (choose the most correct):

- A. The SD line is perpendicular to the regression line
- B. The SD line is always steeper than the regression line
- C. The SD line is parallel to the regression line
- D. The SD line is always very different from the regression line
- E. The slope of the regression line is always bigger than the slope of the SD line

Answer:

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**Problem 16.**

When the scatter plot is like a soccer ball, then the correlation coefficient is about:

- A. -0.5
- B. 0
- C. 0.5
- D. -1
- E. 1

Answer:

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**Problem 17.**

In a certain class, the midterm scores had an average of 50, with an SD of 25. The final scores averaged out to 55, with an SD of 15. The correlation between the midterm and final scores was 0.60. The scatter diagram was football-shaped. For each student, the final score was predicted from the midterm score using the regression line. This prediction is likely to be off by — points or so.

- A. can't tell
- B. 8
- C. 10
- D. 12
- E. 14

*Answer:*



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**Problem 18.**

In an income/education study, the SD of yearly income was \$5000 and the SD of education level (in years of schooling) was 4 years. The correlation was 0.3. What was the slope of the regression line for estimating yearly income from education level?

- A. 0.38 years per \$1000
- B. \$375 per year
- C. 0.24 years per \$1000
- D. \$240 per year
- E. \$500 per year

*Answer:*





**Problem 19.**

In a study of the stability of IQ scores, a large group of individuals is tested once at age 18 and again at age 35. The following results are obtained. age 18: average score is about 100, SD is about 15 age 35: average score is about 100, SD is about 15,  $r$  is about 0.80. Estimate the average score at age 35 for all the individuals who scored 115 at age 18.

- A. can not tell
- B. 120
- C. 100
- D. 112
- E. 115

Answer:



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**Problem 20.**

For a given population of athletes the correlation coefficient between pounds of overweight ( $X$ ) and hours of exercise per week ( $Y$ ) is negative. This means that an athlete who is on the 35th percentile for  $X$  is expected to be on the  $P$ th percentile for  $Y$  where: (choose the most correct)

- A.  $P$  is about  $-35$
- B.  $P$  is bigger than 50
- C.  $P$  is in between 50 and 65
- D.  $P$  is about 35
- E.  $P$  is in between 35 and 50

Answer:



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**EXAM**

FORM 291851  
MAT108 Spring 2007. Exam 2

Section # 9185.

March 20, 2007

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Print your Name: .....  
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- Have your SUNYA-ID card on your desk
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- Do not forget to write the FORM number on the opscan card.

Good Luck!