

S.ID.C.8: Correlation Coefficient 2

- 1 The relationship between t , a student's test scores, and d , the student's success in college, is modeled by the equation $d = 0.48t + 75.2$. Based on this linear regression model, the correlation coefficient could be
 - 1) between -1 and 0
 - 2) between 0 and 1
 - 3) equal to -1
 - 4) equal to 0

- 2 A linear regression equation of best fit between a student's attendance and the degree of success in school is $h = 0.5x + 68.5$. The correlation coefficient, r , for these data would be
 - 1) $0 < r < 1$
 - 2) $-1 < r < 0$
 - 3) $r = 0$
 - 4) $r = -1$

- 3 Which value of r represents data with a strong positive linear correlation between two variables?
 - 1) 0.89
 - 2) 0.34
 - 3) 1.04
 - 4) 0.01

- 4 Which value of a correlation coefficient represents the strongest relationship between the two variables in a given linear regression model?
 - 1) -0.94
 - 2) 0
 - 3) 0.5
 - 4) 0.91

- 5 Which value of r represents data with a strong negative linear correlation between two variables?
 - 1) -1.07
 - 2) -0.89
 - 3) -0.14
 - 4) 0.92

- 6 Which calculator output shows the strongest linear relationship between x and y ?

<p><u>Lin Reg</u> $y = a + bx$ $a = 59.026$ $b = 6.767$</p>	<p><u>Lin Reg</u> $y = a + bx$ $a = 2.45$ $b = .95$</p>
1) $r = .8643$	3) $r = .6022$
<p><u>Lin Reg</u> $y = a + bx$ $a = .7$ $b = 24.2$</p>	<p><u>Lin Reg</u> $y = a + bx$ $a = -2.9$ $b = 24.1$</p>
2) $r = .8361$	4) $r = -.8924$

- 7 What does the correlation coefficient of -0.975 on a linear regression indicate?
 - 1) The slope is positive.
 - 2) One variable causes the other.
 - 3) The scatterplot shows no association of the variables.
 - 4) One variable has a strong relationship with the other.

8 A study compared the number of years of education a person received and that person's average yearly salary. It was determined that the relationship between these two quantities was linear and the correlation coefficient was 0.91. Which conclusion can be made based on the findings of this study?

- 1) There was a weak relationship.
- 2) There was a strong relationship.
- 3) There was no relationship.
- 4) There was an unpredictable relationship.

9 Which statement regarding correlation is *not* true?

- 1) The closer the absolute value of the correlation coefficient is to one, the closer the data conform to a line.
- 2) A correlation coefficient measures the strength of the linear relationship between two variables.
- 3) A negative correlation coefficient indicates that there is a weak relationship between two variables.
- 4) A relation for which most of the data fall close to a line is considered strong.

10 As shown in the table below, a person's target heart rate during exercise changes as the person gets older.

Age (years)	Target Heart Rate (beats per minute)
20	135
25	132
30	129
35	125
40	122
45	119
50	115

Which value represents the linear correlation coefficient, rounded to the *nearest thousandth*, between a person's age, in years, and that person's target heart rate, in beats per minute?

- 1) -0.999
- 2) -0.664
- 3) 0.998
- 4) 1.503

11 The relationship of a woman's shoe size and length of a woman's foot, in inches, is given in the accompanying table.

Woman's Shoe Size	5	6	7	8
Foot Length (in)	9.00	9.25	9.50	9.75

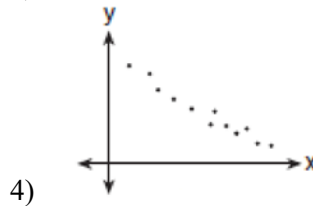
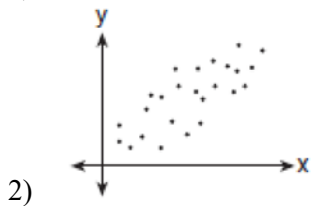
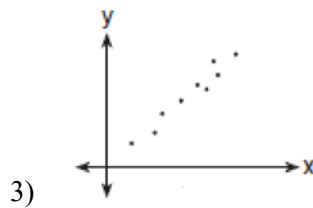
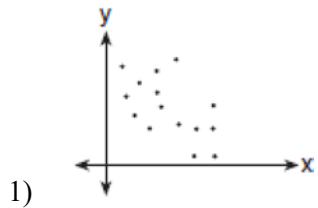
The linear correlation coefficient for this relationship is

- 1) 1
- 2) -1
- 3) 0.5
- 4) 0

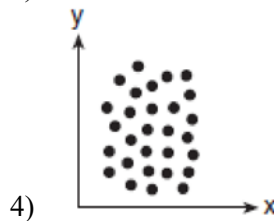
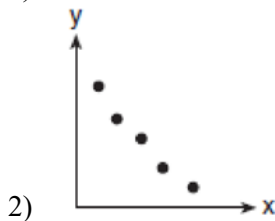
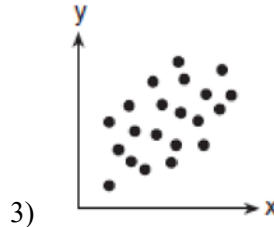
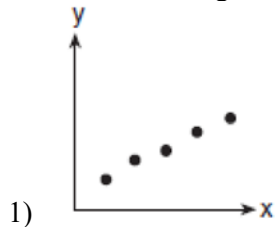
- 12 The points in the scatter plot below represent the ages of automobiles and their values. Based on this scatter plot, it would be reasonable to conclude:



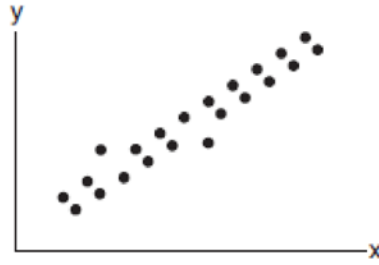
- 1) Age and value have a coefficient of correlation that is less than zero.
 - 2) Age and value have a coefficient of correlation that is equal to zero.
 - 3) Age and value have a coefficient of correlation that is between zero and 0.5.
 - 4) Age and value have a coefficient of correlation that is greater than 0.5.
- 13 Which graph represents data used in a linear regression that produces a correlation coefficient closest to -1 ?



- 14 Which scatter diagram shows the strongest positive correlation?

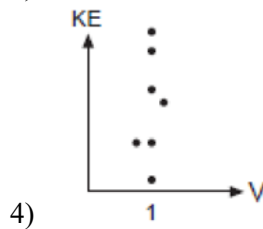
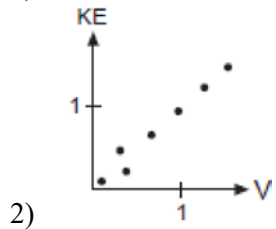
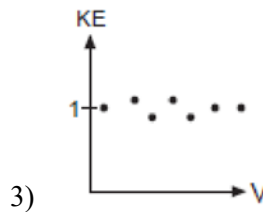
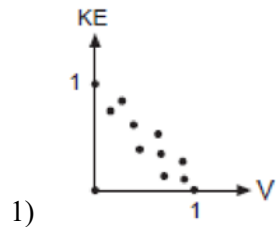


15 What could be the approximate value of the correlation coefficient for the accompanying scatter plot?



- 1) -0.85
- 2) -0.16
- 3) 0.21
- 4) 0.90

16 In the physics lab, Thelma determined the kinetic energy, KE , of an object at various velocities, V , and found the linear correlation coefficient between KE and V to be $+0.8$. Which graph shows this relationship?



17 Determine which set of data given below has the stronger linear relationship between x and y . Justify your choice.

Set A	x	1	2	3	4	5	6
	y	24	30	36	51	70	86

Set B	x	1	2	3	4	5	6
	y	81	64	49	36	25	16

S.ID.C.8: Correlation Coefficient 2**Answer Section**

1 ANS: 2

Since the coefficient of t is greater than 0, $r > 0$.

REF: 011303a2

2 ANS: 1

Because the slope of the linear regression equation of best fit is positive (0.5), the correlation coefficient must be positive.

REF: 060211b

3 ANS: 1

REF: 061316a2

4 ANS: 1

REF: 081624a2

5 ANS: 2

REF: 061021a2

6 ANS: 1

(4) shows the strongest linear relationship, but if $r < 0$, $b < 0$. The Regents announced that a correct solution was not provided for this question and all students should be awarded credit.

REF: 011223a2

7 ANS: 4

REF: 061613a2

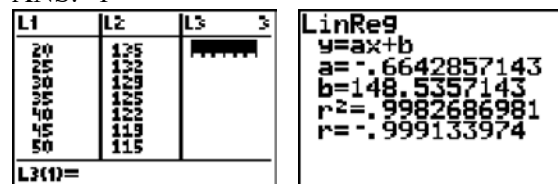
8 ANS: 2

REF: 081502a2

9 ANS: 3

REF: 011616a2

10 ANS: 1



REF: 061225a2

11 ANS: 1

CATALOG
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 DependAsk
 DependAuto
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 DiagnosticOff
 DiagnosticOn



REF: 060109b

12 ANS: 1

The correlation coefficient for the plot must be negative.

REF: fall9910b

13 ANS: 4

If the correlation coefficient (r) is negative, the line of best fit must have a negative slope, eliminating answers (2) and (3). The nearer r is to -1 , the more closely the data cluster around the line of best fit. Answer (4) has a tighter fit than answer (1).

REF: 080306b

14 ANS: 1

Answer (2) has a negative correlation. Answer (4) has no correlation. The closer the data cluster around the line of best fit, the stronger the correlation. Answer (1) has a tighter fit than answer (3).

REF: 010515b

15 ANS: 4

The correlation coefficient for the plot must be positive, eliminating answers (1) and (2). The correlation is rather strong, so the correlation coefficient should be closer to 1.

REF: 060705b

16 ANS: 2

(2) is the only graph that shows a positive correlation.

REF: 010816b

17 ANS:

$r_A \approx 0.976$ $r_B \approx 0.994$ Set B has the stronger linear relationship since r is higher.

REF: 061535a2