

A2.S.8: Correlation Coefficient: Interpret within the linear regression model the value of the correlation coefficient as a measure of the strength of the relationship

- 1) 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
- 2) 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
- 3) Which calculator output shows the strongest linear relationship between x and y ?

Lin Reg

$$y = a + bx$$

$$a = 59.026$$

$$b = 6.767$$

1) $r = .8643$

Lin Reg

$$y = a + bx$$

$$a = .7$$

$$b = 24.2$$

2) $r = .8361$

Lin Reg

$$y = a + bx$$

$$a = 2.45$$

$$b = .95$$

3) $r = .6022$

Lin Reg

$$y = a + bx$$

$$a = -2.9$$

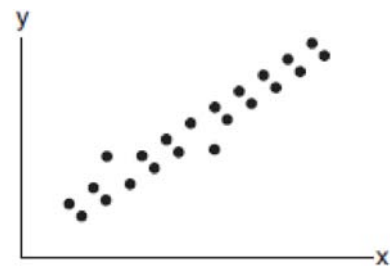
$$b = 24.1$$

4) $r = -.8924$

- 4) 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:

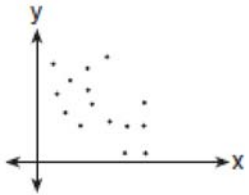
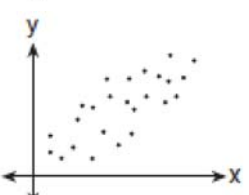
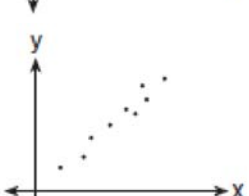
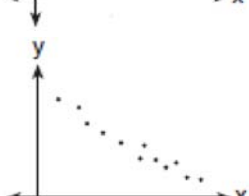


- 1) Age and value have a coefficient of correlation that is less than zero.
 - 2) Age and value have a coefficient of correlation that is equal to zero.
 - 3) Age and value have a coefficient of correlation that is between zero and 0.5.
 - 4) Age and value have a coefficient of correlation that is greater than 0.5.
- 5) What could be the approximate value of the correlation coefficient for the accompanying scatter plot?

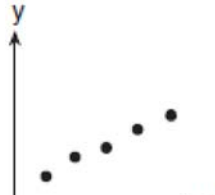
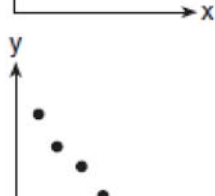
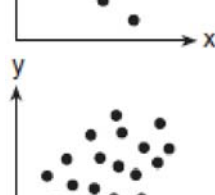



- 1) -0.85
- 2) -0.16
- 3) 0.21
- 4) 0.90

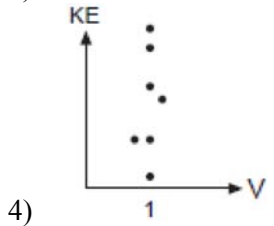
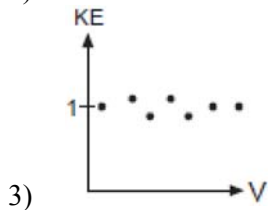
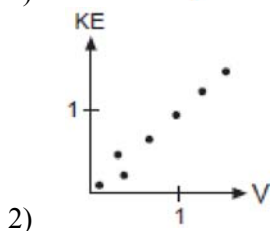
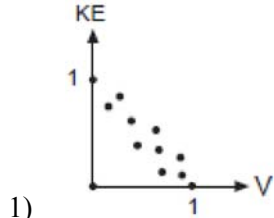
6 Which graph represents data used in a linear regression that produces a correlation coefficient closest to -1 ?

- 1) 
- 2) 
- 3) 
- 4) 

7 Which scatter diagram shows the strongest positive correlation?

- 1) 
- 2) 
- 3) 
- 4) 

- 8 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?



- 9 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
- 10 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) $r = -1$

- 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 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

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Answer Section

1 ANS: 1 REF: 061316a2

2 ANS: 2 REF: 061021a2

3 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

4 ANS: 1 REF: fall9910b

5 ANS: 4 REF: 060705b

6 ANS: 4 REF: 080306b

7 ANS: 1 REF: 010515b

8 ANS: 2 REF: 010816b

9 ANS: 2

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

REF: 011303a2

10 ANS: 1 REF: 060211b

11 ANS: 1 REF: 060109b

12 ANS: 1

L1	L2	L3	Σ
20	125		
30	135		
40	145		
50	155		
60	165		
70	175		
80	185		
90	195		
100	205		
110	215		
120	225		
130	235		
140	245		
150	255		
160	265		
170	275		
180	285		
190	295		
200	305		
210	315		
220	325		
230	335		
240	345		
250	355		
260	365		
270	375		
280	385		
290	395		
300	405		
310	415		
320	425		
330	435		
340	445		
350	455		
360	465		
370	475		
380	485		
390	495		
400	505		
410	515		
420	525		
430	535		
440	545		
450	555		
460	565		
470	575		
480	585		
490	595		
500	605		
510	615		
520	625		
530	635		
540	645		
550	655		
560	665		
570	675		
580	685		
590	695		
600	705		
610	715		
620	725		
630	735		
640	745		
650	755		
660	765		
670	775		
680	785		
690	795		
700	805		
710	815		
720	825		
730	835		
740	845		
750	855		
760	865		
770	875		
780	885		
790	895		
800	905		
810	915		
820	925		
830	935		
840	945		
850	955		
860	965		
870	975		
880	985		
890	995		
900	1005		
910	1015		
920	1025		
930	1035		
940	1045		
950	1055		
960	1065		
970	1075		
980	1085		
990	1095		
1000	1105		

LinReg
y=ax+b
a=-.6642857143
b=148.5357143
r ² =.9982686981
r=-.999133974

REF: 061225a2