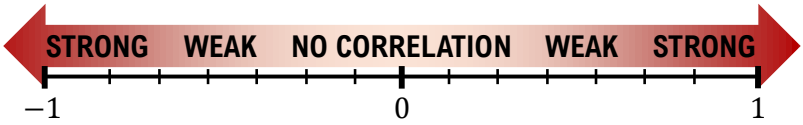
TOPIC: CORRELATION COEFFICIENT

Intro to Correlation Coefficients

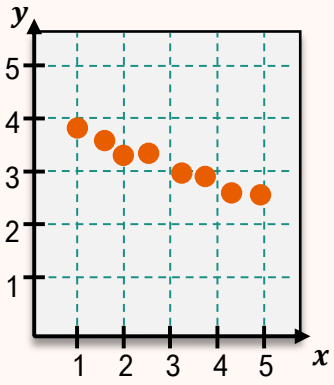
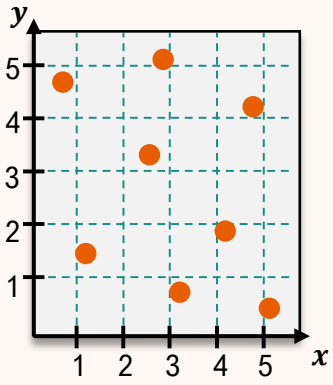
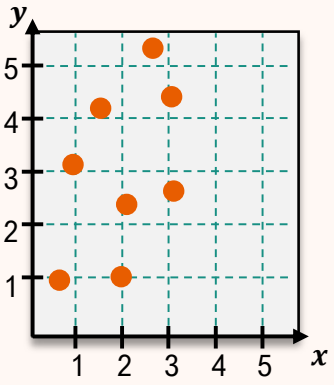
◆ The (**linear**) **correlation coefficient** (r) measures _____ & _____ of correlation between 2 variables.

► The direction of correlation matches the _____ of r.

► Correlaton is "strong" when points are _____ clustered around trend line, r is close to ____ or ____.



EXAMPLE Match each correlation coefficient to its graph: $r_1 = 0.13,\ r_2 = 0.64,\ r_3 = -0.96$

_____ Correlation	_____ Correlation	_____ Correlation
		
$r =$ _____	$r =$ _____	$r =$ _____

◆ Be careful! The slope of the "best-fit line" **DOES NOT** affect the value of r.

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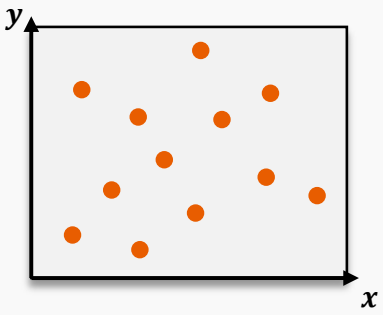
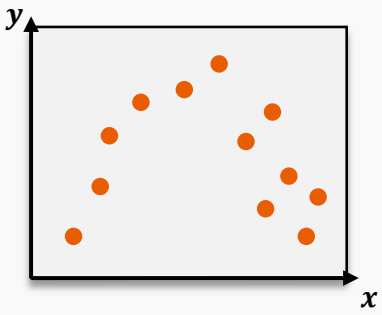
PRACTICE

A data set is found to have a linear correlation coefficient of $r = -0.92$. Which of the following graphs most likely represents the relationship between these variables?

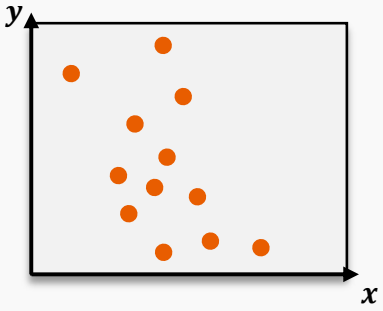
(A)



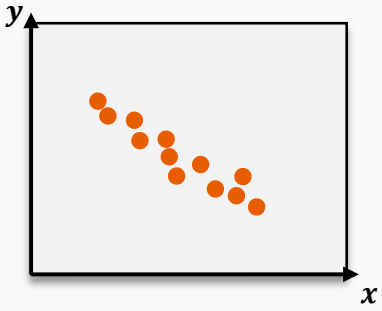
(B)



(C)



(D)



PRACTICE

A marketing researcher analyzed advertising budget vs. monthly sales revenue for small retail stores and found that typically the stores that spent more on advertising saw higher sales revenues. However, the relationship wasn't perfect – some stores advertised more but saw fewer sales due to poor location, customer preferences, or bad timing. Which of the following is the most likely value for the correlation coefficient r between advertising budget and sales revenue?

(A) $r = 0.96$

(B) $r = 0.59$

(C) $r = -0.12$

(D) $r = -0.86$

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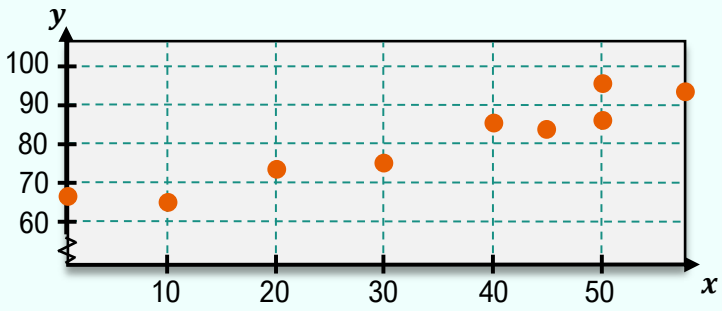
Using a Calculator to Find the Correlation Coefficient

◆ When finding the correlation coefficient, use **LinReg** in the STAT > **CALC** menu.

EXAMPLE Determine the correlation coefficient for the following data.



$r =$ _____

Test Scores vs Time Studying (min)									
Time	50	60	0	40	45	30	50	10	20
Score	86	92	67	84	83	75	96	65	73

HOW TO: Find Correlation Coefficient on TI-84

1) 2ND 0, v to **DiagnosticOn**
(Only needed once)

2) STAT, **1:Edit…**

Enter data in **L1** & **L2**

3) STAT > to **CALC**

4:LinReg(ax+b)

4) **XList:**____ *(any order)*

YList:____

EXAMPLE

A scientist measures the speed of sound (in feet/second) at different altitudes (in thousands of feet) and records the measurements in the table below. Use a calculator to find the linear correlation coefficient. Is there a correlation between these variables?

Altitude vs Speed of Sound											
Altitude, x	0	5	10	15	20	25	30	35	40	45	50
Speed, y	1120.2	1094.7	1076.9	1058.1	1034.5	1015.4	995.0	968.2	967.1	966.5	966.1