

Activity 3.1A Introduction to Correlation

IN CHAPTER 3, WE LEARN HOW TO CREATE SCATTER PLOTS AND WERE INTRODUCED TO LINEAR AND NON LINEAR RELATIONSHIPS.

THIS ACTIVITY IS TO REVIEW GRAPHING SCATTER PLOTS AND INVESTIGATE WHAT A CORRELATION MEANS.

CORRELATION COEFFICIENT

- IS DENOTED BY THE VARIABLE, " r ".
- TO CALCULATE r , YOU MUST GO TO THE CATALOG MENU AND TURN "DIAGNOSTIC ON".

```

CATALOG
→ DiagnosticOn → DiagnosticOn
  dim(
  Disp
  DispGraph
  DispTable
  ▶DMS
  ▶Dot
  Done
  
```

- NOW, TO GET THE CORRELATION (r), GO TO THE STAT MENU AND SELECT CALC **OPTION 8**

```

EDIT [2ND] TESTS
8↑LinReg(a+bx)
  
```

```

LinReg
y=a+bx
a=-.3407676349
b=.4455394191
r2=.8429919846
r=.9181459495
  
```

← THIS IS THE
CORRELATION COEF.

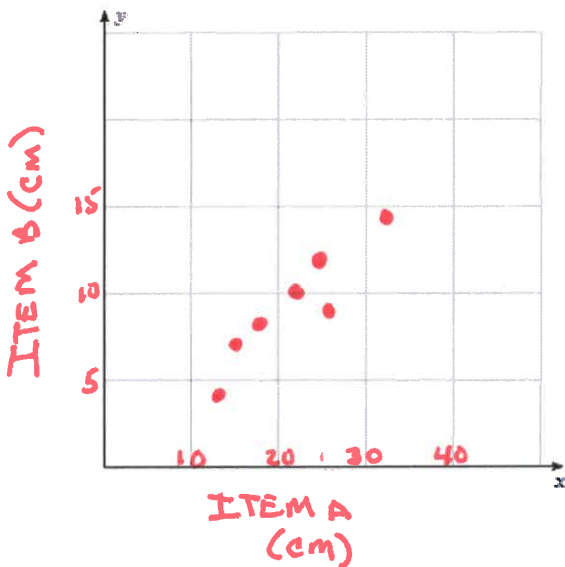
Suppose we take measurements of 2 items (x=item A vs. y=Item B) in centimeters

X (item A)	12	15	21	32	26	19	24
Y (item B)	4	7	10	14	9	8	12

LinReg
 $y=a+bx$
 $a=-3.407676349$
 $b=.4455394191$
 $r^2=.8429919846$
 $r=.9181459495$

a) Sketch scatter plot. Do not forget scale, labels, units.

b) Find r. $r=.9181$



c) What does r mean? "r" measures the linear association between 2 variables

d) Cut-offs for strength of r?



e) Describe the relationship in context (Strength, Direction, Shape)

THE ASSOCIATION IN MEASUREMENTS BETWEEN ITEM A + ITEM B IS POSITIVE, STRONG, AND LINEAR.

NOW EXPLORE:

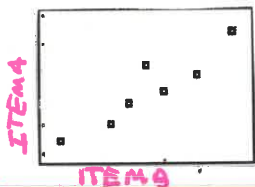
1) For Item A change cm to mm (and put in L3). Sketch Graph. Find r. What happened?



$r=.9181$ NO CHANGE

CORRELATION NOT AFFECTED BY CHANGING UNITS

2) Switch x and y variables. Sketch Graph. Find r. What happened?

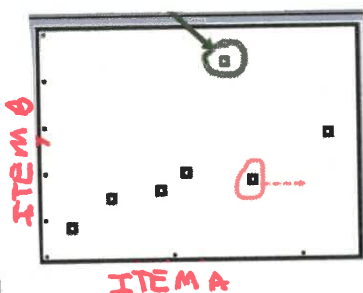


$r=.9181$ NO CHANGE

CORRELATION NOT AFFECTED BY WHICH VARIABLE IS CALLED X AND Y.

3) Change the y-value for 12 to 22. Sketch Graph. Find r. What happened?
Is r a resistant measure?

Add



$r=.6265$

CORRELATION IS AFFECTED BY EXTREME VALUES.

THEREFORE "r" IS NOT A RESISTANT MEASURE (LIKE MEAN and S.D.)