Answer to Question #91019 – Math – Statistics and Probability

Question

d) Every week, Hilda buys four apples and three bananas from her local greengrocer. The table shows the total weight, x grams, of the four apples and the corresponding total weight, y grams, of the three bananas for each of a random sample of 13 weeks.
X 562 633 578 621 558 593 607 638 527 623 579 588 524
Y 366 320 379 407 422 394 325 369 387 395 446 364 457

i). Calculate, to three decimal places, the value of the product moment correlation coefficient, r, between x and y. [3 marks]
ii). Interpret, in context, your value for r . [2 marks]
iii). Howard, Hilda's husband, claims that each week she buys either big apples and big bananas or small apples and small bananas. Comment on Howard's claim

Solution

S.No.	x	y	x^2	y^2	x*y
1	562	366	315844	133956	205692
2	633	320	400689	102400	202560
3	578	379	334084	143641	219062
4	621	407	385641	165649	252747
5	558	422	311364	178084	235476
6	593	394	351649	155236	233642
7	607	325	368449	105625	197275
8	638	369	407044	136161	235422
9	527	387	277729	149769	203949
10	623	395	388129	156025	246085
11	579	446	335241	198916	258234
12	588	364	345744	132496	214032
13	524	457	274576	208849	239468
Total	7631	5031	4496183	1966807	2943644

Answer to part i).

R=correlation coefficient= $\frac{[n\sum x\times y-(\sum x)\times(\sum y)]}{\left[\sqrt{n\sum x^2-(\sum x)^2}\right]\times\left[\sqrt{n\sum y^2-(\sum y)^2}\right]}$

R=correlation coefficient= $\frac{[13\times 2943644-7631\times 5031]}{\left[\sqrt{13\times 4496183-7631^2}\right]\times\left[\sqrt{13\times 1966807-5031^2}\right]}$

R=correlation coefficient= $\frac{-124189}{467.1381\times 507.4741}$

R=correlation coefficient=-0.524

Answer to part ii).

Since the value of correlation coefficient is -0.524 (i.e., negative) total weight of 3 bananas decreases with increase in total weight of 4 apples.

As they have moderate negative relationship.

Answer to part iii).

Claim of Hilda's husband is false that each week she buys either big apples and big bananas or small apples and small bananas as value of correlation coefficient is negative therefore if one will be bigger than other one will be smaller.