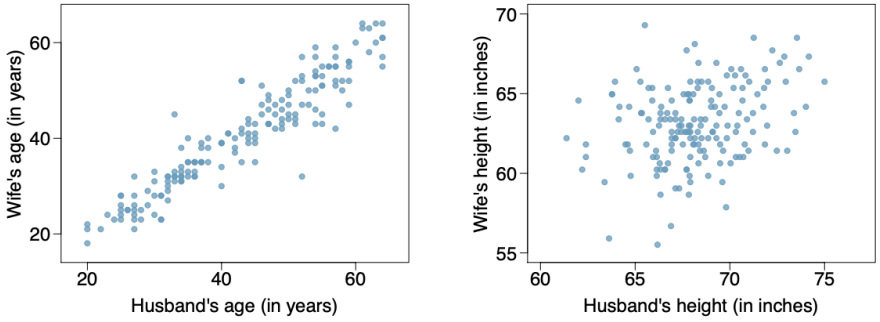
Equitable Equations: *Scatterplots and correlation*

The following problems are taken from *OpenIntro Statistics*, Fourth Edition, by David Diez, Mine Çetinkaya-Rundel, and Christopher Barr. Pay what you want or download for free at `https://www.openintro.org/book/os/`

Problem 1

8.6 Husbands and wives, Part I. The Great Britain Office of Population Census and Surveys once collected data on a random sample of 170 married couples in Britain, recording the age (in years) and heights (converted here to inches) of the husbands and wives.[5] The scatterplot on the left shows the wife's age plotted against her husband's age, and the plot on the right shows wife's height plotted against husband's height.



(a) Describe the relationship between husbands' and wives' ages. Linear

(b) Describe the relationship between husbands' and wives' heights. Unknown

(c) Which plot shows a stronger correlation? Explain your reasoning.

Ages shows a stronger correlation because it is more condensed.

Problem 2

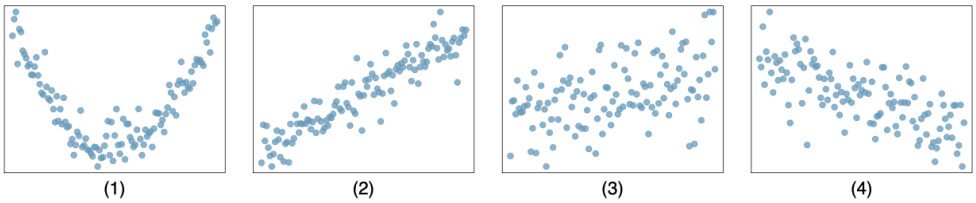
8.7 Match the correlation, Part I. Match each correlation to the corresponding scatterplot.

4 (a) $R = -0.7$

3 (b) $R = 0.45$

1 (c) $R = 0.06$

2 (d) $R = 0.92$



0.06 0.92 0.45 -0.7

Problem 3

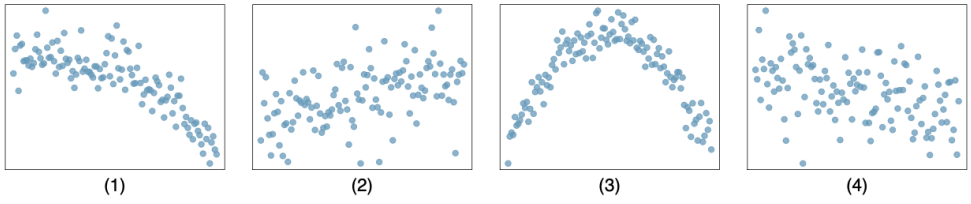
8.8 Match the correlation, Part II. Match each correlation to the corresponding scatterplot.

2 (a) $R = 0.49$

4 (b) $R = -0.48$

3 (c) $R = -0.03$

1 (d) $R = -0.85$



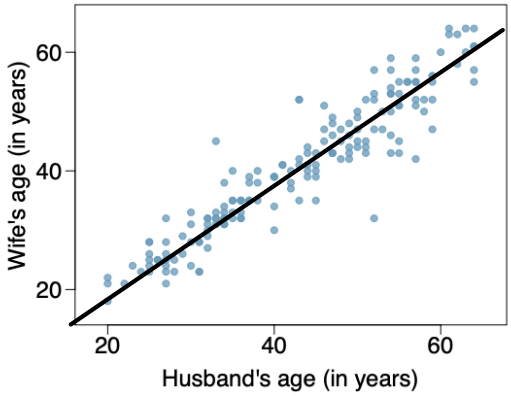
-0.85 0.49 -0.03 -0.48

Equitable Equations: *Introducing linear regression*

The following plots are taken from *OpenIntro Statistics*, Fourth Edition, by David Diez, Mine Çetinkaya-Rundel, and Christopher Barr. Pay what you want or download for free at `https://www.openintro.org/book/os/`

Problem 1

Refer to the following scatterplot.



(a) Identify the explanatory and response variables in this plot. (Husband age, Wife age)

(b) Describe the relationship between these variables. positive linear

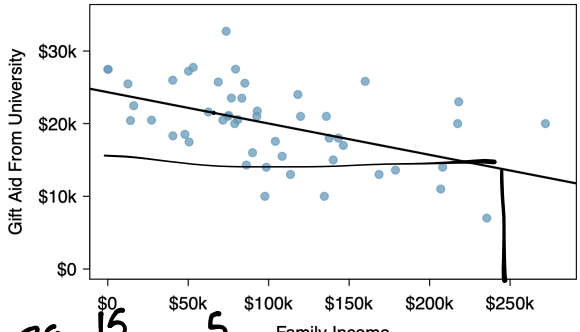
(c) Draw a line of best fit on this scatterplot.

(d) Estimate the slope of this line. Interpret your answer. ~1, partners are around the same age

(e) Write the equation of the regression line in point-slope form. $y-20=1(x-20)$

Problem 2

Refer to the following scatterplot.



$\frac{20-15}{150-250}=\frac{5}{100}$

(a) Identify the explanatory and response variables in this plot. (Family Income, University Aid)

(b) Estimate the slope of the regression line. Interpret your answer. -0.05, for every 1k that family income increases, gift aid decreases by 0.05k

(c) Write the equation of the regression line in point-slope form. $y-20=-0.05(x-150)$