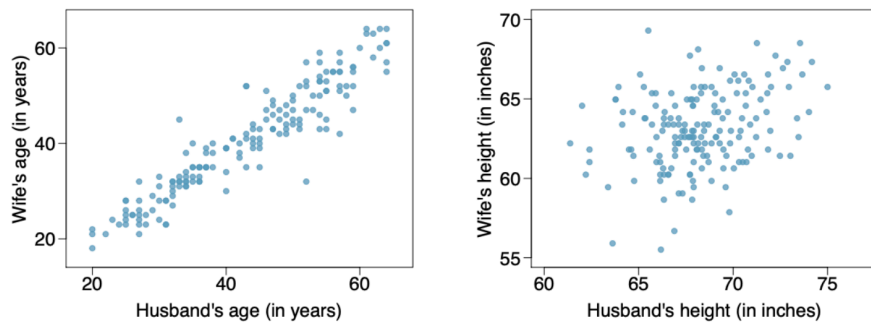


## Scatterplots & Correlation

### 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.<sup>5</sup> 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.
- (b) Describe the relationship between husbands' and wives' heights.
- (c) Which plot shows a stronger correlation? Explain your reasoning.

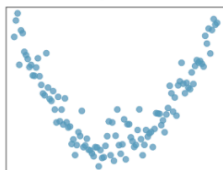
### Answer:

- (a) Positive Strong
- (b) Positive Weak
- (c) The Husband's age scatterplot as they are closer and therefore illustrate a more collaterated data

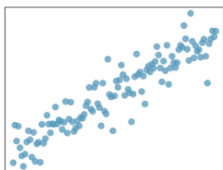
## Problem 2

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

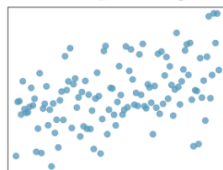
- (a)  $R = -0.7$
- (b)  $R = 0.45$
- (c)  $R = 0.06$
- (d)  $R = 0.92$



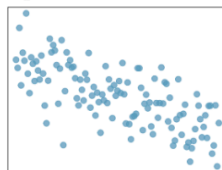
(1)



(2)



(3)



(4)

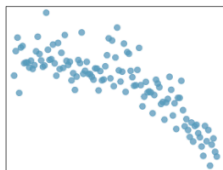
**Answer:**

- (a) 4
- (b) 1
- (c) 3
- (d) 2

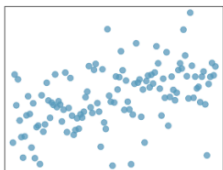
## Problem 3

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

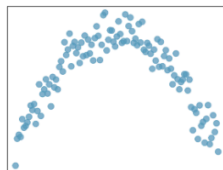
- (a)  $R = 0.49$
- (b)  $R = -0.48$
- (c)  $R = -0.03$
- (d)  $R = -0.85$



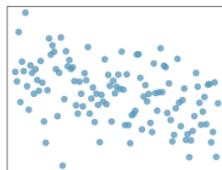
(1)



(2)



(3)



(4)

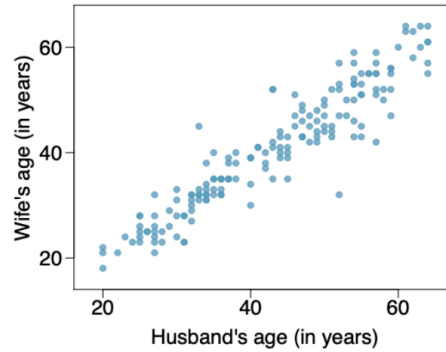
**Answer:**

- (a) 2
- (b) 4
- (c) 3
- (d) 1

# Introducing linear regression

## Problem 1

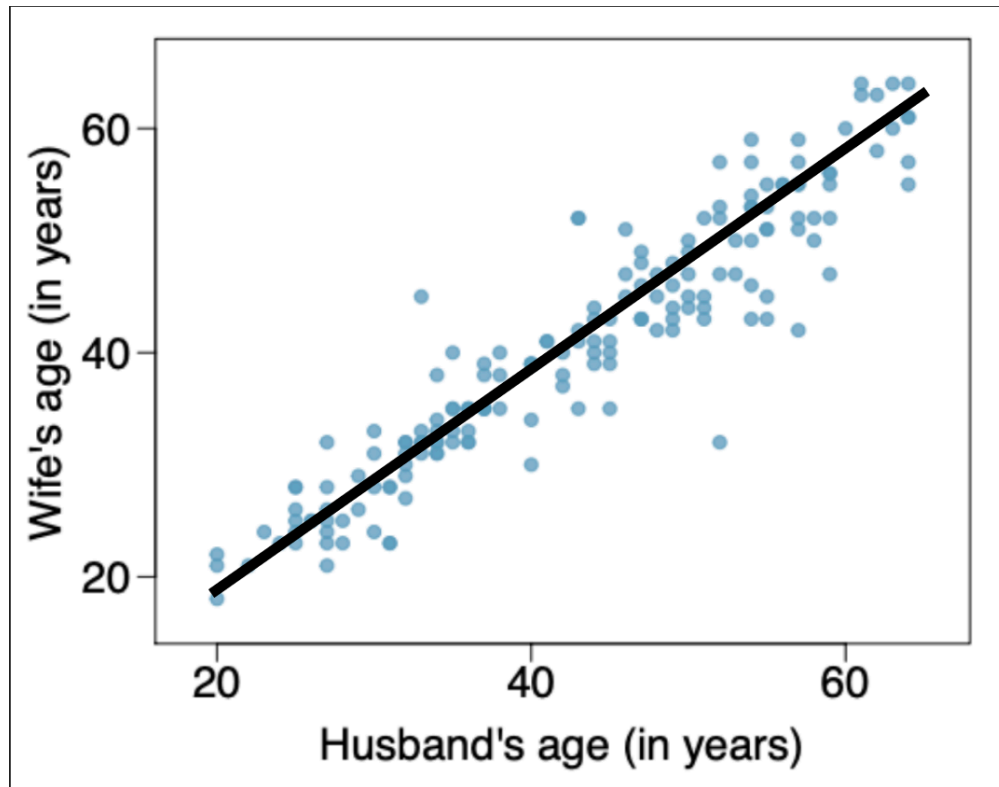
Refer to the following scatterplot.



- (a) Identify the explanatory and response variables in this plot.
- (b) Describe the relationship between these variables.
- (c) Draw a line of best fit on this scatterplot.
- (d) Estimate the slope of this line. Interpret your answer.
- (e) Write the equation of the regression line in point-slope form.

### Answer:

- (a) Explanatory Variable is the Husband's Age, and the Response Variable is the Wife's Age.
- (b) The relationship is strong positive
- (c)



(d) About maybe 70. Could have been more.

(e) For this we need to calculate the points and slope:

$$p1 : (20, 21)$$

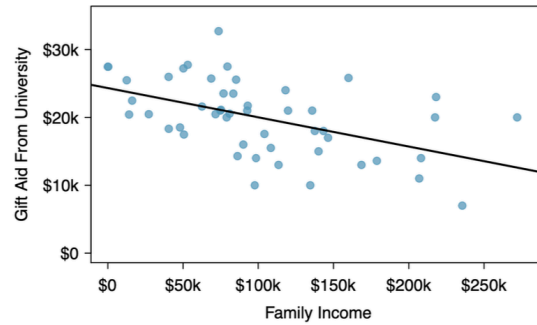
$$p2 : (40, 30)$$

$$m = \frac{\Delta p1}{\Delta p2} = \frac{9}{10} = 0.9$$

$$y = 0.9x + 39$$

## Problem 2

Refer to the following scatterplot.



- (a) Identify the explanatory and response variables in this plot.
- (b) Estimate the slope of the regression line. Interpret your answer.
- (c) Write the equation of the regression line in point-slope form.

**Answer:**

- (a) Explanatory Variable is the Family Income, and the Response Variable is the Gift Aid from University.
- (b) About  $-0.30$ . It is weak negative, and has very little correlation.
- (c) For this we need to calculate the points and slope:

$$p1 : (20000, 20000)$$

$$p2 : (98000, 10000)$$

$$m = \frac{\Delta p1}{\Delta p2} = -\frac{10000}{88000} = -0.11$$

$$y = -0.11x + 21.1$$