

Math 373 Hw 3 Worked examples and comments.

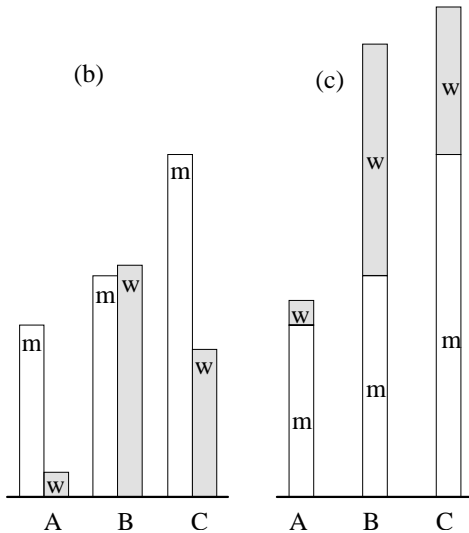
Hw. 96: 3.2, 106:3.7'. 126: 4.2, 4.4, 4.6 Rec. 96: 3.1, 106: 3.7, 126: 4.3, 4.5, 4.7 .

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3.1 Males and females are divided into three groups A, B, C according to their answers to a questionnaire.

	A	B	C
men	37	49	72
women	7	50	31

- (b) Create a side-by-side bar chart for this dataset.
 (c) Create a stacked bar chart for this dataset.

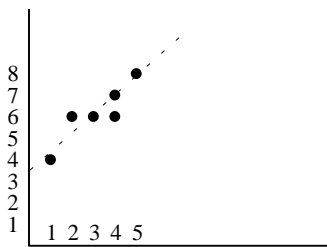


If for each group A, B, C, we wish to compare the relative proportions of males and females, (b) is better. If we primarily wish to compare the totals of A, B, and C, then (c) is better.

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3.7 The bivariate dataset for variables (x,y) is:
 (3,6) (5,8) (2,6) (1,4) (4,7) (4,6).

- (a) Draw a scatterplot for the dataset.
 (b) What, if any, is the relation between x and y ?
 (c) Find the correlation coefficient r .
 (d) Find the equation of the best-fitting line.



- (a) (b) Positive correlation
 (c) $r = .903$
 (d) $y = 3.585 + .815x$

Do this problem using a "two variable statistics" calculator. You will need it for the very first exam and you should practice using it now.

With your calculator, you will enter the pairs one at a time, (3,6), (5, 8), (2, 6),

Once the data has been entered, press the key which gives the number n of data items. It should give 6 in this problem. If not, you may have missed an item or entered an item twice; in this case clear the calculator and enter the data again.

Now there should be keys which give r and the coefficients a and b for the regression line $y = a + bx$. If you have operated the calculator correctly, you should get $r = .903$, $a = 3.585$, $b = .815$.

You should be able to approximate the regression line $y = a + bx$ graphically without calculation. Plot the points of the scatter plot and position a ruler to draw a straight line which best fits the data (see the picture above). In the equation $y = a + bx$, a will be the y-intercept and b will be the slope. The a and b you get with the calculator should be consistent the approximate line you drew with a ruler.

In the lecture we first defined s_{xy} and then defined the correlation coefficient r by $r = s_{xy}/(s_x s_y)$. This is also the way we would calculate r by hand.

But while your calculator can get r , it probably doesn't give s_{xy} . To get s_{xy} with your calculator, solve $r = s_{xy}/(s_x s_y)$ for s_{xy} to get $s_{xy} = r s_x s_y$.

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4.5 A jar has 4 coins: a nickel, a dime, a quarter, a half-dollar. Three coins are randomly and simultaneously selected from the jar.

- (a) List the simple events.
 Answer: Let N, D, Q, H be the four coins.
 (a) sample space = {NDQ, NDH, NQH, DQH}.

Since the coins are drawn simultaneously, order doesn't matter and NDQ represents the outcome that one got a nickel, dime and a quarter. If order did matter, e.g., if the coins were drawn one at time and we cared about which was drawn first and which was drawn second, then instead of one outcome NDQ with one nickel, one dime and one quarter, there would be 6 outcomes: NDQ, NQD, DNQ, DQN, QDN, QND.