Second Review for Math 23 Summer 2006

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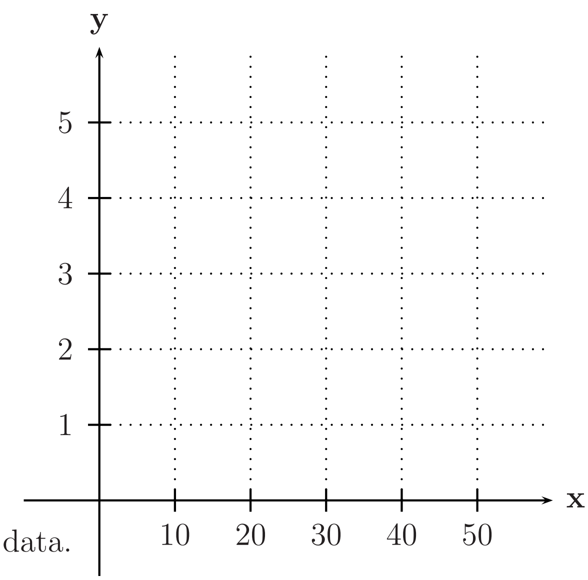
1. The manager of a salmon cannery suspects that the demand for her product is closely related to the disposable income of her target region. To test out this hypothesis she collected the following data for five different target regions, where x represents the annual disposable income for a region in millions of dollars and y represents sales volume in thousands of cases.

x	y
10	1
20	3
40	4
50	5
30	2



   (a) Draw the scatter graph of this set of data.

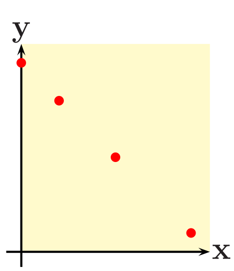
   (b) Compute the correlation coefficient r.

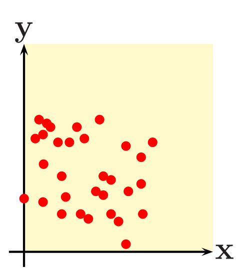
   (c) Find the least square line.

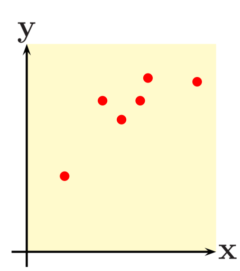
   (d) If a region has disposable annual income $25,000,000$ what is the predicted sales volume?

2. Match the appropriate statement about r and the scatter diagrams.

   A. $r = 0$. B. $r = -1$. C. r is more than 0 and less than 1.







3. Two dice are rolled. Find the probability of the following events:
   (a) Both numbers are 6.
   (b) The first dice gives 5 and the second 6.
   (c) There is one 5 and one 6.
   (d) The sum is equal to 10.
   (e) The sum is equal to 4.
   (f) The sum is 4 or 10.
   (g) The sum is more than 5 but less than 8.
   (h) Both numbers are even.
   (i) One number is even and one number is odd.
   (j) Both numbers are odd.

4. An urn contains three yellow, four green and five blue balls. Two balls are randomly drawn without replacement. Find the probability of the following events:
   (a) Both balls are blue.
   (b) The first ball is green and the second yellow.
   (c) There is one green and one yellow ball.

5. Repeat the previous exercise but now assume that the balls are drawn with replacement.

6. Three cards are randomly drawn from a standard 52 card deck without replacement. Find the probability of the following events:
   (a) All cards are red.
   (b) There are two red and one black card.
   (c) All cards are spades.
   (d) There is one spade, one club, and one diamond.
   (e) All cards are aces.
   (f) Two cards are aces and one card is a King.

7. Consider the following discrete probability distribution:

x	2	3	4	5	6
P(x)	.25	.1	.3	.2	.15

   Sketch the graph of this distribution and calculate its expected value and standard deviation.

8. A fair coin is tossed 7 times. Sketch the graph of the resulting binomial distribution.

9. Mr. Ecks and Mr. Zee play the following game: two cards are drawn from a standard 52-card deck, if they are both red Mr. Ecks wins otherwise Mr. Zee wins. If they play these game 16 times what is the probability that Mr. Ecks will win 4 or less times?

10. If 30% of the people in a community use the Library in one year, find the probability that in a random sample of 15 people

    (a) At most 7 use the Library,

    (b) Exactly 7 use the Library,

    (c) At least 5 use the Library.

11. One-third of all deaths are caused by heart attacks. If three deaths are chosen randomly, find the probability that none resulted from heart attack.

12. Find z so that:

    (a) 98% of the area under the standard normal curve lies between $-z$ and z.

    (b) 97.5% of the area under the standard normal curve lies to the left of z.

    (c) 46% of the area under the standard normal curve lies to the right of z.

13. Find the area under the standard normal curve

    (a) between $z = -2.74$ and $z = 2.333$.

    (b) between $z = -2.47$ and $z = 1.03$.

14. The scores in a standardized test are normally distributed with $\mu = 100$ and $\sigma = 15$. Find the percentage of scores that will fall below 112.

15. If the salary of computer technicians in the United States is normally distributed with the mean of $\$32,550$ and the standard deviation of $\$2,000$, find the probability for a randomly selected technician to earn more than $\$35,000$.