Prince Sultan University
Department of Mathematical Sciences
STAT 101 – Second Examination
28 April 2010

Time allowed: 90 minutes
Maximum points: 40 points

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1. (7 points) Given that:
$$n = 10, \quad \sum x_i = 65, \quad \sum y_i = 132.5, \quad \sum x_i y_i = 986,$$
$$s_x^2 = 9.1667, \quad s_y^2 = 22.125$$
Find the equation of the best fitting line. Describe the relationship between x and y.

2. (6 points) The teachers in a college are classified according to their grades and their nationalities.

	Professors	Associate	Assistant
National	5	7	18
Foreign	12	15	17

(a) Draw a stacked bar chart to describe the data.
(b) What is the probability that a teacher selected at random is a professor given that he is a foreigner.

3. (2 points) In a recent year, of the 30000 bachelor's degrees conferred, 5500 were in the field of business, 4200 were in the social sciences, and 3500 were in education. If one degree is selected at random, find the probability that the degree was not awarded in business.

4. (4 points) Suppose that $P(A) = 0.4$, $P(B) = 0.35$, and $P(A \cup B) = 0.61$. Show that A and B are independent.

5. (4 points) Omar takes a taxi, a bus, or the subway to go to work with probabilities 0.1, 0.25, and 0.65, respectively. When he takes the taxi, he is late 20% of the days. When he takes the bus, he is late 35% of the days. When he takes the subway, he is late 15% of the days. If Omar is late for work on a particular day, what is the probability that he took the bus?

6. (4 points) A smoke-detector system uses two devices, A and B. If smoke is present, the probability that it will be detected by device A is 0.93; by device B, 0.95; and by both

devices, 0.9. Find the probability that the smoke will not be detected.

7. (3 points) If two balanced dice are rolled, what is the probability that the sum is 8?

8. (3 points) If three fair coins are tossed, what is the probability that all three faces will be the same?

9. (1 point) A bus driver can take three routes from city *A* to city *B*, four from city *B* to city *C*, and two from city *C* to city *D*. If when traveling from *A* to *D*, the driver must drive from *A* to *B* to *C* to *D*, how many possible *A*-to-*D* routes are available?

10. (3 points) A student prepares for an exam by studying a list of 20 problems. She can solve 14 of them. For the exam, the instructor selects 10 questions at random from the list of 20. What is the probability that the student can solve exactly 7 problems on the exam?

11. (1 point) A bag contains 2 blue, 3 green and 5 red balls. If I draw one ball at random, what is the probability that the ball is blue?

12. (2 points) A dice and a coin are thrown. What is the probability of a 4 and a head?
