Problems 1–10 are multiple choice. 5 points for each correct response, 1 point deducted for each wrong answer

For Problems 1 and 2.

A group of 5,000 families were sorted by size. A histogram was made from that distribution. In the category of size 7 to 9 (inclusive), there are 210 families.

1. The height of that block for 7 to 9 is:

(A) 4.20% (B) 4.20% per person (C) 1.4% per person (D) 1.05% per person (E) 2.10% per person

2. The area of that block represents:

(A) family size (B) percent (C) density (D) propensity (E) width of the base

3. A list has 4 entries: 1, 2, 3, and 4. Convert the smallest number on the list to standard units.

(A) -2.1213 (B) -1.5 (C) -1.3416 (D) -1.22474 (E) -1

4. The average height for a group of women was 63.274 inches and the SD was 2.8934 inches. The height of a certain woman was 1.467 SDs above average. What is her height in standard units?

(A) 1 (B) 1.467 (C) 2 (D) 2.8934 (E) 4.2446 (F) 67.5

For Problems 5 and 6:

In the NBA (National Basketball Association), the chance of a typical player hitting a free-point throw is about 78%. Suppose that four free-point throws are selected randomly and independently from various games.

5. The chance that at least one of the four shots results in a miss is around:
(A) 22%
(B) 37%
(C) 63%
(D) 88%
(E) 99.77%

6. The chance that exactly one of the four shots results in a miss is around:

(A) 3.3% (B) 10.4% (C) 22% (D) 37% (E) 42%

7. A fair coin is tossed 1625 times. Estimate the chance of getting exactly 823 heads.

(A) 1.74% (B) 3.48% (C) 3.89% (D) 6.96% (E) 20%

- 8. A standard deck contains 52 cards: 36 numbered cards and 16 face cards. Five hundred draws are made at random with replacement from such a deck.
 The percentage of numbered cards drawn should end up around 69.23%, give or take:
 (A) 0.0923% (B) 0.13846% (C) 0.9546% (D) 2.064% (E) 3.096%
- 9. A box contains a large number of tickets. The numbers on these tickets average out to 500, and the SD is 20.
 Sixty-four (64) tickets are drawn at random with replacement.
 Find the chance that the average of the draws will be in the range 499 to 501.
 - (A) 1.995% (B) 3.99% (C) 15.54% (D) 31.08% (E) 99.863%
- 10. A truck is weighed 120 times on a truck scale. The 120 readings average 15,212 pounds, and the SD of the 120 readings is 21 pounds. (Assume the Gauss model.)The actual weight of the truck is off from 15,212 pounds by about how much?
 - (A) 0.7 pounds (B) 1.917 pounds (C) 3.834 pounds (D) 21 pounds (E) 126.767 pounds

Problems 11 to 16 are worth 9 points each. Show all work. No deductions for wrong answers.

11. Find the correlation coefficient, r, for this data set.

х	У
1	9
3	15
4	12
5	11
7	3

For problems 12, 13, and 14

A group of women in a survey produced the following data:

average weight = 130 pounds, SD = 20 pounds average height = 66 inches, SD = 3 inches, r = 0.4

12. A woman picked at random from the above group weighs 164 pounds. Predict her height.

13. Find the root-mean-square error of the regression line for predicting height from weight.

- 14. Find the regression equation for predicting height from weight. Use it to predict heights for 130 pounds and for 164 pounds.
- 15. A coin was tossed 150 times and got 90 heads.

Find P and decide if the coin is fair or gets too many heads.

16. A gambler is accused of using a loaded die, but he pleads innocent. A record has been kept of the last 150 throws. There is disagreement about how to interpret the data and a statistician is called in.

The observed frequencies for the six numbers on the die are summarized in this table.

	Observed	
Value	frequency	
1	19	A χ^2 -test of the
2	27	null hypothesis
3	31	that the die is
4	24	fair was made.
5	17	Estimate P and
6	32	state the conclu-
		sion.