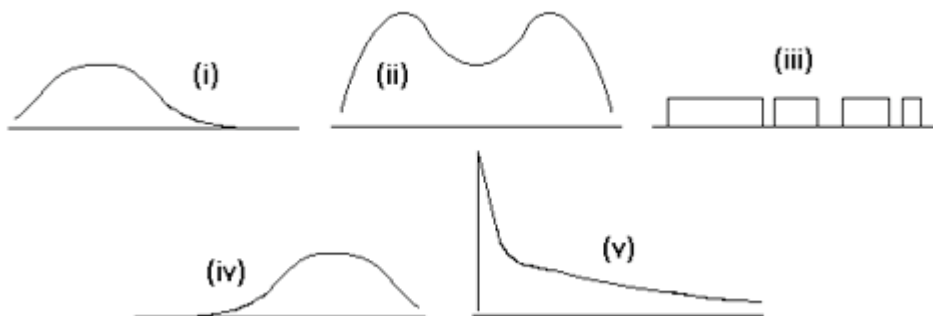


Math 102 / Core 143 BX — Exam I

Show all work clearly for partial credit. An unsimplified answer like $12\sqrt{3.51} + 6/7$ is usually worth more than 23.3, because it is easier to understand where it came from. If your calculator has buttons for statistical functions like average or standard deviation, do not use them for the computations below.

- (20 points) For a list of numbers consisting of 6 ones, 3 twos, and 1 eighteen, find the
 - average
 - standard deviation
 - median
 - 20-th percentile
 - IQR (interquartile range)
- (16 points) Which of these histograms represent each of the following lists of data? You may use any histogram more than once or not at all. If you are not sure, or if you cannot find one that looks right, feel free to sketch your own and explain why it is better than the given histograms.
 - jersey numbers of Colgate football players in the 2005 season
 - heights of people at a party of Big Brothers/Sisters and their Little Brothers/Sisters
 - the numbers of shirts owned by various men
 - scores on an easy statistics exam



- (15 points) The coordinates of a data point are described. If many data points of each kind are collected, would the correlation coefficient be closest to -1 , -0.5 , 0 , 0.5 , or 1 ?
 - A person's birthdate (number of days into the year) and his/her IQ.
 - The average number of hours per day a person spends watching TV and the hours he/she spends reading.
 - A child's height measured in inches and the same child's height measured in centimeters.

4. (30 points) A side effect of a certain drug is to change blood pressure. Dosage of the drug and systolic blood pressure are recorded for a large number of patients, and the following “summary data” is found:

	dose (mg)	pressure (mmHg)	
AV	40	120	$r = 0.8$
SD	20	15	

On the basis of this data, estimate:

- the systolic blood pressure of a randomly chosen patient (with no information on his dosage).
 - the likely error in the estimate found in (a)
 - the systolic blood pressure of a patient whose dosage is 60 mg.
 - the dosage of a patient whose systolic blood pressure is measured as 110 mmHg.
 - the likely error in the estimate found in (d).
5. (9 points) Every 6th-grade class in an elementary school must take an achievement test. Here are the percentages of boys and girls who passed in each class:

	Ms. A	Mr. B	Ms. C	Mr. D
boys	20%	10%	60%	40%
girls	30%	20%	70%	50%

Which of the following statements must be true on the basis of this information? (Neither, one or both may be necessarily true.) Explain your answers.

- The percentage of girls in that school who passed is larger than the percentage of boys who passed.
 - The percentage of girls who passed must be between 20% and 70%.
6. (10 points) According to the article “Coddling Human Guineas Pigs” by Sharon Begley, for what kind of research is it more difficult to get funding from the National Institutes of Health, and what two reasons are given for it?

Some possibly useful formulas:

$$\sqrt{\text{average of } (x - \bar{x})^2} \qquad \sigma_y \cdot \sqrt{1 - r^2}$$

$$r = \text{average of } ((x \text{ in std units}) \cdot (y \text{ in std units}))$$

$$z = \frac{x - \bar{x}}{\sigma_x} \qquad x = z \cdot \sigma_x + \bar{x}$$

$$y - \bar{y} = (\text{sign of } r) \frac{\sigma_y}{\sigma_x} (x - \bar{x}) \qquad y - \bar{y} = r \frac{\sigma_y}{\sigma_x} (x - \bar{x})$$