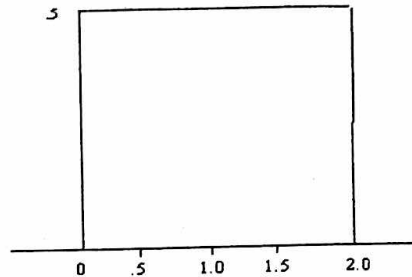


1. For the density curve below, what percent of the observations lie between 0.5 and 1.2?

- (a) 25%
- (b) 35%**
- (c) 50%
- (d) 68%
- (e) 70%

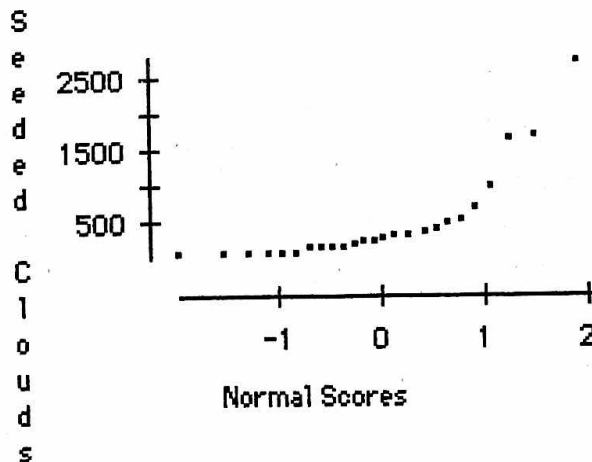


2. For the probability density function illustrated above, which of the following is true?

- I. The mean is equal to the median.
- II. The interquartile range is equal to 0.5.
- III. The proportion of outcomes exceeding 0.5 is equal to 0.75.

- (a) I only
- (b) II only
- (c) I and III**
- (d) II and III
- (e) I, II, and III

3. The following graph is a normal probability plot for the amount of rainfall in acre-feet obtained from 26 randomly selected clouds that were seeded with silver oxide:



- (a) The data appear to show exponential growth; that is, the amount of rainfall increases exponentially as the amount of silver oxide increases.
- (b) The pattern suggests that the measurement is not normally distributed.**
- (c) A least squares regression line should be fitted to the rainfall variable.
- (d) It can be expected that the histogram of rainfall amount will look like the normal curve.
- (e) The shape of the curve suggests that rainfall is caused by seeding the clouds with silver oxide.

4. There are three children in a room, ages three, four, and five. If a four-year-old child enters the room the

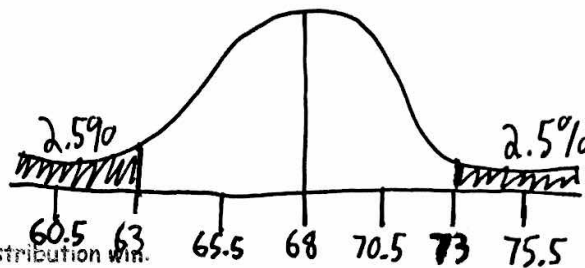
- (a) mean age will stay the same but the variance will increase.
- (b) mean age will stay the same but the variance will decrease.**
- (c) mean age and variance will stay the same.
- (d) mean age and variance will increase.
- (e) mean age and variance will decrease.

5. The heights of American men aged 18 to 24 are approximately normally distributed with mean 68 inches and standard deviation 2.5 inches. Half of all young men are shorter than

- (b) 65.5 inches
- (c) 68 inches**
- (d) 70.5 inches
- (e) Cannot tell, because the median height is not given
- (f) None of the above

6. Use the information in the previous problem. Only about 5% of young men have heights outside the range

- (a) 65.5 inches to 70.5 inches
- (b) 63 inches to 73 inches**
- (c) 60.5 inches to 75.5 inches
- (d) 58 inches to 78 inches
- (e) None of the above



7. Increasing the frequencies in the tails of a distribution will

- (a) not affect the standard deviation as long as the increases are balanced on each side of the mean
- (b) not affect the standard deviation
- (c) increase the standard deviation**
- (d) reduce the standard deviation
- (e) none of the above

8. Suppose that the distribution of math SAT scores from your state this year is normally distributed with mean 480 and standard deviation 100 for males, and mean 440 and standard deviation 120 for females. If someone who scores 780 or higher on math SAT can be considered a genius, what is the proportion of geniuses among the male SAT takers?

$$\text{normalcdf}(780, 1E99, 480, 100) = 0.001349$$

- (a) 28%
- (b) 14%
- (c) 3%
- (d) 1.4%
- (e) 0.14%**

9. A normal density curve has which of the following properties?

- (a) It is symmetric.
- (b) It has a peak centered above its mean.
- (c) The spread of the curve is proportional to its standard deviation.
- (d) All of the properties, (a) to (c) are correct.**
- (e) None of the properties, (a) to (c) is correct.

10. The length of pregnancies from conception to natural birth among a certain female population follows a normal distribution with mean 270 and standard deviation 10 days.

(a) What percent of pregnancies last more than 300 days?

$$z = \frac{300 - 270}{10} \quad \left| \quad P(Z > 3) = 1 - 0.9987 \right.$$

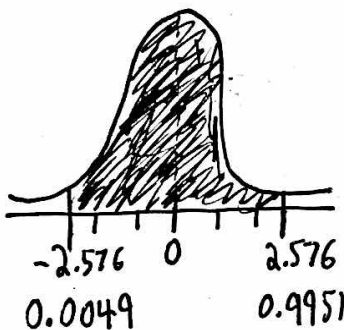
$$z = 3.00 \quad \left| \quad = 0.0013 \Rightarrow 0.13\% \right.$$

(b) How short must a pregnancy be in order to fall in the shortest 10% of all pregnancies?

$$0.10 \Rightarrow z = -1.28 \quad \left| \quad X \leq 257.2 \text{ days} \right.$$

$$-1.28 = \frac{X - 270}{10}$$

11. In a normally distributed population, what percent of the population observations lie within 2.576 standard deviations of the mean? Include a sketch to illustrate your answer.

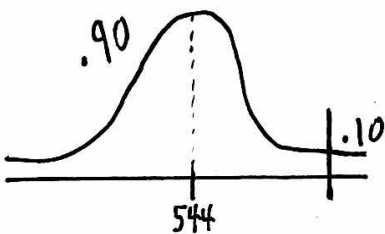


$$0.9951 - 0.0049 = 0.9902$$

↓

$$99.02\%$$

12. The Graduate Record Examinations are widely used to help predict the performance of applicants to graduate schools. The range of possible scores on a GRE is 200 to 900. The psychology department finds that the scores of its applicants on the quantitative GRE are approximately normal with mean 544 and standard deviation 103. What minimum score would a student need in order to score in the top 10% of those taking the test?



$$1.28 = \frac{X - 544}{103}$$

$$X \approx 675.84$$

Approximately a score of 676 or higher