Normal Distribution: Review*

Susan Dean
Barbara Illowsky, Ph.D.

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The next two questions refer to: $X \sim U(3, 13)$

Exercise 1 *(Solution on p. 3.)*

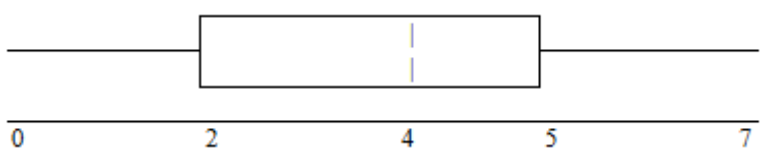
Explain which of the following are false and which are true.

a: $f(x) = \frac{1}{10}$, $3 \leq x \leq 13$
b: There is no mode.
c: The median is less than the mean.
d: $P(x > 10) = P(x \leq 6)$

Exercise 2 *(Solution on p. 3.)*

Calculate:

a: Mean
b: Median
c: 65th percentile.



Exercise 3 *(Solution on p. 3.)*

Which of the following is true for the above box plot?

a: 25% of the data are at most 5.
b: There is about the same amount of data from $4 - 5$ as there is from $5 - 7$.
c: There are no data values of 3.
d: 50% of the data are 4.

Exercise 4 *(Solution on p. 3.)*

If $P(G \mid H) = P(G)$, then which of the following is correct?

A: G and H are mutually exclusive events.
B: $P(G) = P(H)$

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C: Knowing that H has occurred will affect the chance that G will happen.
D: G and H are independent events.

Exercise 5 ***(Solution on p. 3.)***

If $P(J) = 0.3$, $P(K) = 0.6$, and J and K are independent events, then explain which are correct and which are incorrect.

A: $P(J \text{and} K) = 0$
B: $P(J \text{or} K) = 0.9$
C: $P(J \text{or} K) = 0.72$
D: $P(J) \neq P(J \mid K)$

Exercise 6 ***(Solution on p. 3.)***

On average, 5 students from each high school class get full scholarships to 4-year colleges. Assume that most high school classes have about 500 students.

X = the number of students from a high school class that get full scholarships to 4-year school. Which of the following is the distribution of X?

A. P(5)
B. B(500,5)
C. Exp(1/5)
D. N(5, (0.01)(0.99)/500)

Solutions to Exercises in this Module

Solution to Exercise (p. 1)

a: True
b: True
c: False – the median and the mean are the same for this symmetric distribution
d: True

Solution to Exercise (p. 1)

a: 8
b: 8
c: $P(x < k) = 0.65 = (k - 3) * \left(\frac{1}{10}\right)$. $k = 9.5$

Solution to Exercise (p. 1)

a: False – $\frac{3}{4}$ of the data are at most 5
b: True – each quartile has 25% of the data
c: False – that is unknown
d: False – 50% of the data are 4 or less

Solution to Exercise (p. 1)

D

Solution to Exercise (p. 2)

A: False - J and K are independent so they are not mutually exclusive which would imply dependency (meaning P(J and K) is not 0).
B: False - see answer C.
C: True - P(J or K) = P(J) + P(K) - P(J and K) = P(J) + P(K) - P(J)P(K) = 0.3 + 0.6 - (0.3)(0.6) = 0.72. Note that P(J and K) = P(J)P(K) because J and K are independent.
D: False - J and K are independent so P(J) = P(J|K).

Solution to Exercise (p. 2)

A