AP stats Chapter 2 Practice Test
Modeling distributions of data

Name _____
Per ___ Date _____

According to the National Center for Health Statistics, the distribution of heights for 15-year old males is symmetric, single-peaked, and bell shaped. For this distribution, a z-score of 0 corresponds to a height of 170 centimeters and a z-score of 1 corresponds to a height of 177.5 centimeters.

_____ 1.) What is the mean and standard deviation of the data?
- a.) Mean = 170cm, standard deviation = 177.5cm
- b.) Mean = 177.5 cm, standard deviation = 170 cm
- c.) Mean = 170cm, standard deviation = 7.5 cm
- d.) Mean = 7.5cm, standard deviation = 177.5 cm
- e.) Mean = 0, standard deviation = 1

_____ 2.) What height would correspond to a z-score of 2.5?
a.) 188.75 cm b.) 151.25 cm c.) 196.25 cm d.) 158.75 cm
e.) None of the above is correct

_____ 3.) Only 5% of 15-year old males have heights outside of the range of
- a.) 162.5cm to 177.5cm
- b.) 155cm to 185cm
- c.) 147.5cm to 192.5 cm
- d.) 170cm to 185cm
- e.) None of the above is correct

_____ 4.) What percent of 15-year old males are over 185cm tall?
a.) 95% b.) 5% c.) 97.5% d.) 2.5% e.) 68%

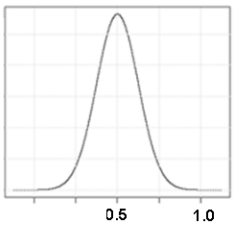
Use a **standard normal distribution** to answer the questions

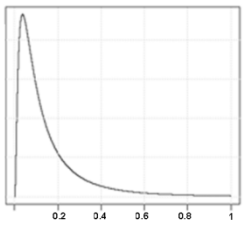
_____ 5.) The proportion of scores that are less than 1.25 is closest to
a.) 0.8944 b.) 0.1056 c.) 0.5987 d.) 0.4013 e.) None of the above

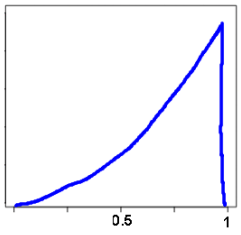
_____ 6.) The proportion of scores that are greater than -1.45 is closest to
a.) 0.6736 b.) 0.3264 c.) 0.0735 d.) 0.9265 e.) None of the above

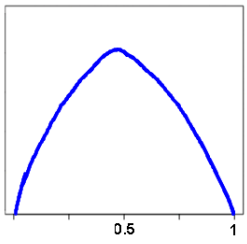
_____ 7.) The percent of scores that fall between -1.45 and 1.25 is closest to
a.) 10.56 b.) 7.35 c.) 89.47 d.) 32.64 e.) 82.08

List all statements that apply to each density graph: Normal, right-skewed, left-skewed, symmetric, area under the curve is 1, mean is greater than median, median is greater than mean, mean and median are equal.

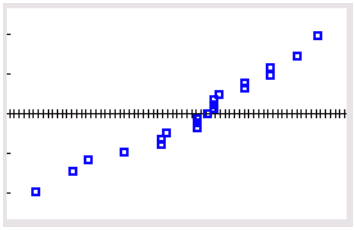
8.) 

9.) 

10.) 

11.) 

_____ 12. The graph to the right is a Normal Probability Plot for the raw scores on the chapter 1 test. Which of the statements is true about the shape of the test scores?



a.) The distribution is approximately normal
b.) The distribution is skewed left
c.) The distribution is skewed right
d.) There are no outliers
e.) There is insufficient information to determine the shape of the distribution

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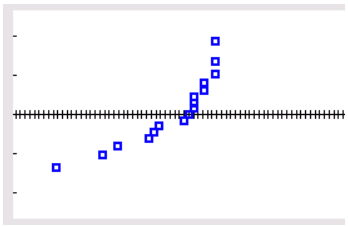

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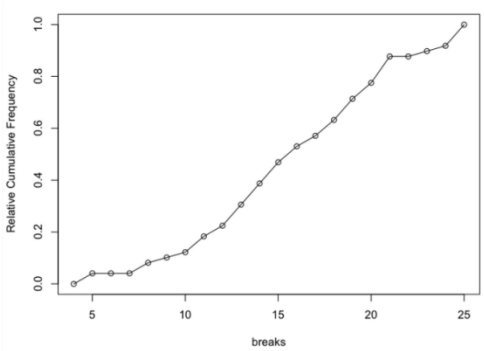

The cumulative relative frequency graph at the left shows the distribution of how long it takes a vehicle to stop after pressing on the breaks at a certain speed.

_____ 14.) The interquartile range for the distribution is
a.) 12 b.) 20
c.) 32 d.) 8 e.) 25

_____ 15.) Approximately what proportion of the cars stopped in *more* than 10 seconds?
a.) 0.85 b.) 0.15
c.) 0.30 d.) 0.70 e.) 25

_____ 16.) A group of Australian students were asked to estimate the width of their classroom in feet. The mean was 43.7ft, the standard deviation was 12.5ft, and the distribution was skewed right. The distribution of their z-scores for the width is
a.) Normally distributed with a mean of 43.7 and a standard deviation of 12.5
b.) Skewed left with a mean of 43.7 and a standard deviation of 12.5
c.) Skewed right with a mean of 43.7 and a standard deviation of 12.5
d.) Normally distributed with a mean of 0 and a standard deviation of 1
e.) Skewed right with a mean of 0 and a standard deviation of 1

_____ 17.) The principle reason for the use of *random assignment* in designing experiments is that it
a.) distinguishes a treatment effect from the effects of confounding variables.
b.) allows double-blinding.
c.) reduces sampling variability.
d.) creates approximately equal groups for comparison.
e.) eliminates the placebo effect.

_____ 18.) The principle reason for the use of *controls* in designing experiments is that it
a.) distinguishes a treatment effect from the effects of confounding variables.
b.) allows double-blinding.
c.) reduces sampling variability.
d.) creates approximately equal groups for comparison.
e.) eliminates the placebo effect.

_____ 19.) In an experiment, an observed effect so large that it would rarely occur by chance is called
a.) an outlier. b.) influential. c.) statistically significant.
d.) bias. e.) replication.

20.) The Presidential Physical Fitness Program gives awards to those who meet qualifying standards in five events. The standards are based on the 1985 School Population Fitness Survey. For the National Award, the standard is the 50^{th} percentile for a specific age group and gender.

Jane, who is 9 years old, did 40 curl-ups in one minute. Matt, who is 12 years old, also did 40 curl-ups in one minute. The standard for the National Award are 30 curl-ups for Jane and 35 curl-ups for Matt. The standard deviation is 10 and 8 curl-ups respectively. The distributions are approximately normal.

a.) How do Jane's and Matt's performances compare? Provide appropriate statistical calculations to support your answer.

b.) Estimate the number of 9-year old girls that could do more than 40 curl-ups, if 250 girls participated in the program.

c.) Estimate the 90^{th} percentile for 12-year old boys.

21.) Rainwater was collected in water collectors at 30 different sites near an industrial complex, and the amount of acidity (pH level) was measured. The mean and standard deviation of the values are 4.60 and 1.10, respectively. When the pH meter was recalibrated back at the laboratory, it was found to be in error. The error can be corrected by adding 0.1 pH units to all of the values and then multiplying the result by 1.2. What is the new mean and standard deviation? Show all your work and explain your reasoning.

22.) Until the scale was changed in 1995, SAT scores were based on a scale set many years ago. For Math scores, the mean under the old scale was 470 and the standard deviation was 110. In 2009, the mean was 515 and the standard deviation was 116.

a.) What is the standardized score for a student who scored 500 on the old scale?

b.) Jane took the SAT in 1994 and scored 500. Colleen took the SAT in 2009 and scored 530. Compare their scores. Provide appropriate statistical calculations to support your answer.

c.) The distributions for the tests are approximately normal. Find the 75^{th} percentile for both tests.

d.) The distributions for the tests are approximately normal. What percentage of students scored above 800 on both tests?