

Directions: Complete each problem in your notebook. Be sure to show all work!
As long as you remember your calculator, you do not have to use Table A at all!

DO-NOW:

- 1.) The 40th percentile is equivalent to a z-score of: _____
- 2.) The 67th percentile is equivalent to a z-score of: _____

3.) **OPEN ENDED**

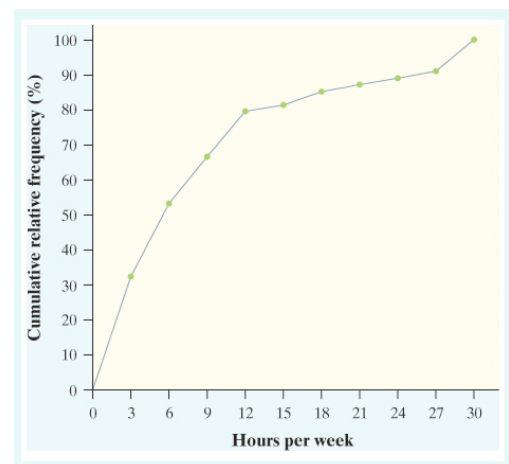
You are performing a study about the height of 20- to 29-year-old men. You randomly sample 30 men and find their heights to be as follows.

72.1	71.2	67.9	67.3	69.5	68.6	68.8	69.4	73.5	67.1
69.2	75.7	71.1	69.6	70.7	66.9	71.4	62.9	69.2	64.9
68.2	65.2	69.7	72.2	67.5	66.6	66.5	64.2	65.4	70.0

- a.) Check how closely this data follows the Empirical Rule (by drawing the big diagram).
 - b.) Using your graphing calculator, create a normal probability plot for this data. What can you say about the normality of the data based on the plot? Why?
- 4.) **TRUE or FALSE**
- a.) All symmetric curves are normal distributions. _____
 - b.) Almost all of the area under a normal curve is within 3 standard deviations of the mean. _____

- 5.) Mrs. Dynarski asked her students how much time they had spent working on their homework notebooks during the previous week. The following figure shows a cumulative relative frequency graph (ogive) of her students' response.

- a) At what percentile does a student who spent 7 hours on homework last week fall?



- 6.) Meghan scored an 87 on her biology test, where the class average was an 82 with a standard deviation of 3. Her best friend, Nicole scored an 84 on a history test, where the class average was 78 with a standard deviation of 2.
- a) Who scored better on their test and why? (Hint: Find their z-scores and compare)

MULTIPLE CHOICE

- 7.) The 50th percentile is equivalent to a z-score of:
- (a) 0 (b) 1 (c) 2 (d) 3
- 8.) The 73rd percentile is equivalent to a z-score of:
- (a) 0.77 (b) 0.27 (c) 0.61 (d) -0.61
- 9.) The distribution of scores on a certain standardized exam is normal, with mean 500 and standard deviation 100. The median score on the exam:
- (a) could be anywhere between 400 and 600.
(b) is equal to 500.
(c) is less than 500.
- 10.) Scores on the American College Testing (ACT) college entrance exam following $N(18, 6)$. Peter's standardized score on the ACT was $z = -1.1667$. What was her actual ACT score?
- (a) 11 (b) 13.8 (c) 4.2
- 11.) The lifetime of a 2-volt non-rechargeable battery in constant use has a normal distribution with a mean of 516 hours and a standard deviation of 20 hours. The proportion of batteries with lifetimes exceeding 520 hours is approximately:
- (a) 0.2000 (b) 0.5793 (c) 0.4207
- 12.) The lifetime of a 2-volt non-rechargeable battery in constant use has a normal distribution with a mean of 516 hours and a standard deviation of 20 hours. 90% of all batteries have a lifetime shorter than:
- (a) 517.28 hours (b) 536.00 hours (c) 541.60 hours
- 13.) A company that manufactures and bottles apple juice has a machine that automatically fills 16-ounce bottles. There is, however, some variation in the exact amount of juice dispensed into each bottle by the machine. Over a long period of time, the average amount dispensed into the bottles was 16-ounces, but there is a standard deviation of 1 ounce in these measurements. If the amount of liquid per bottle can be assumed to have a normal distribution, find the percentage of bottles that will either be overfilled or under filled by at least 0.5 ounce.
- (a) 30.85% (b) 38.30% (c) 61.70%

- 14.) The National Collegiate Athletic Association (NCAA) requires Division I athletes to score at least 820 on the combined mathematics and verbal parts of the SAT exam in order to compete in their first college year. In 1999, the scores of the millions of students taking the SATs were approximately normal with mean 1017 and standard deviation 209. What percent of all students had scores less than 820?
- 15.) It is possible to score higher than 800 on either part of the SAT, but scores above 800 are reported as 800. In 1999, the scores of men on the math part of the SAT followed a normal distribution with mean 531 and standard deviation 115. What percent of scores were above 800 (and reported as 800)?
- 16.) Scores on the Wechsler Adult Intelligence Scale for the 20 to 34 age – group are approximately normally distributed with mean 110 and standard deviation 25. How high must a person score to be in the top 25% of all scores?
- 17.) Bags of oranges in a shipment averaged 8 pounds with a standard deviation of 0.5 pounds. A histogram of these weights followed a normal distribution quite closely. What percent of the bags weighed more than 8.25 pounds?
- 18.) Students taking an introductory statistics class in fall 2000 reported spending an average of \$205 on textbooks that quarter with a standard deviation of \$90. Assuming that the data is approximately normal:
- a.) Approximately what percent of the students spend between \$115 and \$295 on textbooks that quarter?