AP Statistics

Extra Review

Key

(1) (a) Find the proportion of observations from a standard Normal distribution that satisfies $0.51 < Z < 2.84$. Sketch the Normal curve and shade the area under the curve that is the answer to the question.

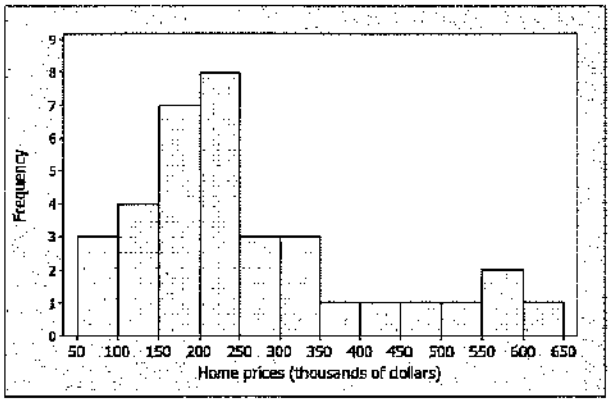
normalcdf...
low = .51
high = 2.84
μ = 0
σ = 1
} 0.303 ≈ 30.3%

(b) What z-score in a Normal distribution has 22% of all scores above it?

→ 78% below

invnorm(
area = .78
μ = 0
σ = 1
) Z = .772

(2) A real estate company compiled data on the prices at which 35 homes sold during a one month in a county in New Jersey. A histogram and some summary statistics from Minitab for the home prices are given below. (Note that home prices are in thousands of dollars.)



Descriptive Statistics: home prices

Variable	N	Mean	SE Mean	StDev	Minimum	Q1	Median	Q3	Maximum
home prices	35	260.8	24.6	145.6	80.0	165.0	220.0	307.0	626.0

(a) One of the houses in this data set sold for 350 thousand dollars. Six houses sold for more than that. Calculate and interpret the percentile and z-score for this house's price.

35 − 7 = 28 below

$\frac{28}{35} = .8 \rightarrow 80\%$

This means that this house sold for more than 80% of the homes in this county.

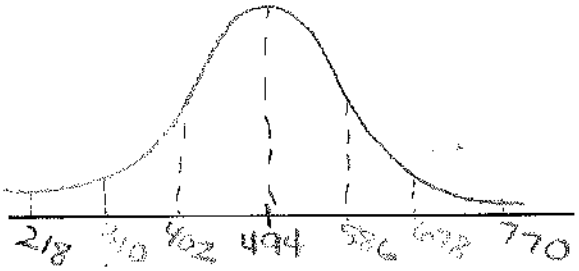
(b) What was the "typical" price for a home in this county during the month in which these data were collected? Justify your answer.

typical = center → median → $220,000

(since skewed)

(3) The Program for International Student Assessment (PISA) conducts tests in mathematics in countries throughout the world. For 15-year-olds in all developed countries, the scores in 2012 were Normally distributed with a mean of 494 and standard deviation of 92.

(a) Make an accurate sketch of the distribution of PISA math scores. Be sure to provide a scale on the horizontal axis.



(b) Use the 68–95–99.7 rule to find the proportion of scores between 402 and 678.

34 + 34 + 13.5 = 81.5%

(c) The mean score for U.S. students was 481. What proportion of all scores were below the U.S. mean?

normalcdf
low = 0
high = 481
mean = 494
S.d = 92
} .444 or 44.4%

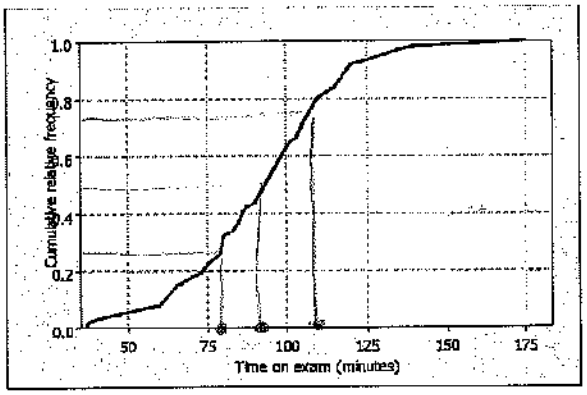
(d) What proportion of all PISA scores were above 700?

normalcdf
low = 700
high = 9999
mean = 494
S.d. = 92
} .013 or 1.3%

(e) Calculate and interpret the 34th percentile of the distribution of PISA scores.

invnorm
area: .34
mean = 494
S.d. = 92
} 456.05

(4). Below is a cumulative relative frequency graph for the length of time a group of 62 students spent on a no-time-limit final exam in Algebra II.



(a) What are the median and interquartile range for the amount of time these students spent on the exam? Draw lines on the graph to show how you arrived at your answers.

$Q_1 \approx 77$

$\text{med} \approx 88$

$Q_3 \approx 105$

$Q_3 - Q_1 = IQR$

$105 - 77 = 28$

(b) According to these data, the mean time students spent on the exam was 94.1 minutes, and the standard deviation was 24.23 minutes. Suppose the exam proctor realized after compiling these data that he had used the wrong start time in his calculation, so that each value for time spent on exam needs to be reduced by 15 minutes. He also wants to express the times in hours, rather than minutes. Find the mean and standard deviation of the transformed data.

-15 and $\cdot \frac{1}{60}$

$x_{new} = (x - 15) \cdot \frac{1}{60}$

$\bar{x} = 94.1 \xrightarrow{\frac{-15}{\div 60}} 1.3183 \text{ hrs}$

$s = 24.23 \xrightarrow{\div 60} .40383 \text{ hrs}$