MAT 135, Discussion Questions 2.10

1. When someone says they are above the 90th percentile, what does that mean?

90% of all the measurements are less than that value

2. If you have an ordered list of 38 terms, and you want to determine which element in the list is the 85th percentile, how do you do it? Which element is it?

$38 \times .85 = 32.3$

approximately the 32nd or 33rd value in the sorted list

3. What percentile is the 14th element in the list?

$\frac{14}{38} \approx .368$ or 37th percentile

4. What percentile is the median value? What is the percentile for the first quartile? Third quartile?

50th 25th 75th

5. Consider the data set

14	36	40	43	44	49	51	51	55	55
55	56	61	61	63	67	70	75	78	82

a. What is the median?

55

b. What is Q1? What is Q3?

$\frac{44+49}{2} = 46.5$ $\frac{63+67}{2} = 65$

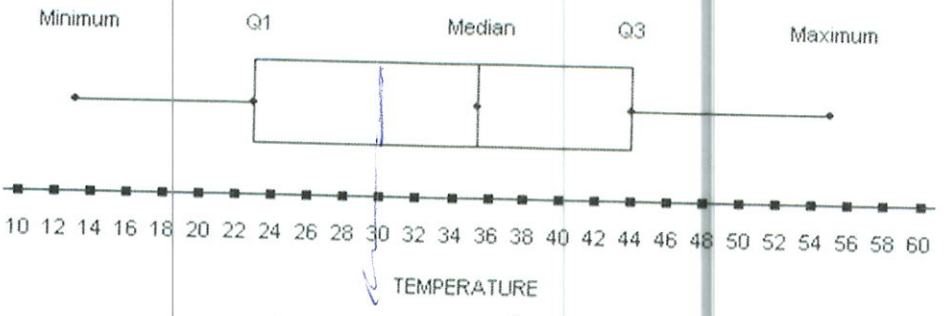
c. What is the interquartile range (IQR)?

$65 - 46.5 = 18.5$

6. How can you tell from a boxplot If the distribution is skewed or symmetric?

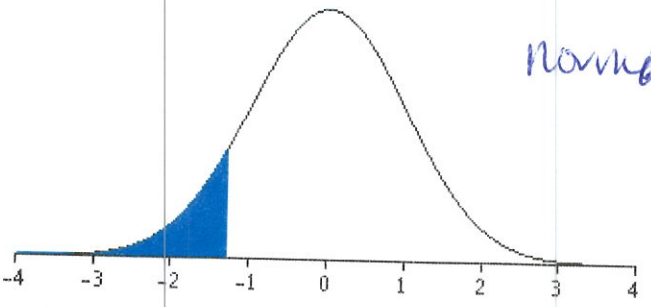
is the box divided evenly by the mean
are the whiskers the same length? longer side is the tail side. If they're the same, symmetric

7. What temperature represents approximately the 38th percentile based on the box plot shown?



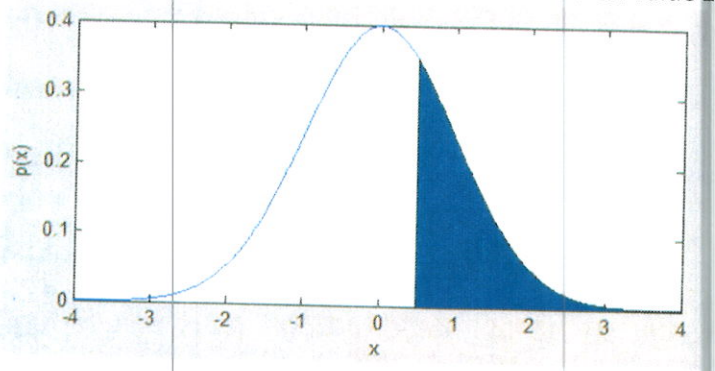
25th < 38th < 50th ⇒ around 29 or 30

8. Find the shaded area for the shaded region using the table of z-values from the textbook.
   a. Find the shaded area under the curve if the mean is 0 and the standard deviation is 1. The cut-off score here is $z = -1.28$.



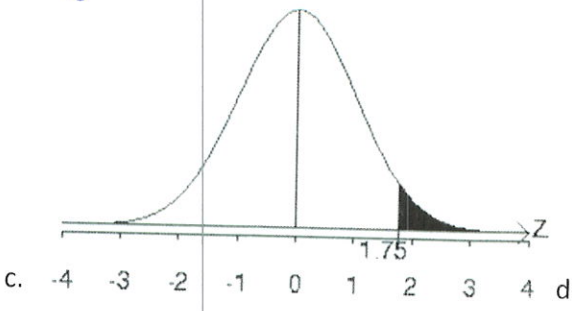
normalcdf(-E99, -1.28) = 100...
10th percentile

   b. Find the shaded area under the curve for the cut-off value $z = 0.5$.

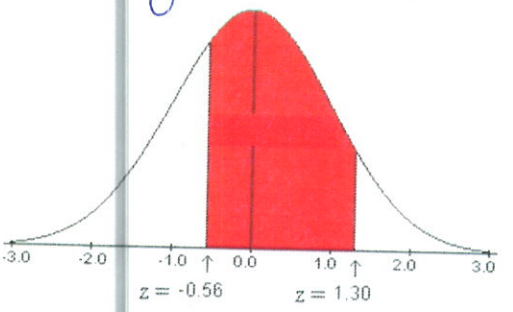


normalcdf(.5, E99) = .3085...

normalcdf(1.75, E99) = .04...



normalcdf(-.56, 1.30) = .615...



9. What is the percentile of each of these cut-off scores in the graphs above?

a) 10th percentile
b) 69th percentile
c) 96th percentile
d) 29th percentile ≠ 90th percentile

10. What is the standard score of someone whose IQ is 135 if the mean of the distribution is 100 and the standard deviation is 15?

$$z = \frac{135-10}{15} = 2.33$$

11. If a student takes the ACT, which has a mean of 21 and a standard deviation of 5.2, and obtains a score of 25, do they have a higher or lower score than another student who took the SAT, which has a mean of 1498 and a standard deviation of 199, obtained a score of 1780.

$$z_{ACT} = \frac{25-21}{5.2} = .769$$

$$z_{SAT} = \frac{1780-1498}{199} = 1.417$$

SAT score is higher

12. Who is smarter? Someone with an IQ of 148 with a mean of 100 and a standard deviation of 15, or someone with an IQ of 167 with a mean of 110 and a standard deviation of 20?

$$z_1 = \frac{148-100}{15} = 3.2$$

148 IQ is higher

$$z_2 = \frac{167-110}{20} = 2.85$$

13. Your calculator has two boxplot graphing functions. How are they different?

One plots outliers and one only uses 5# summary