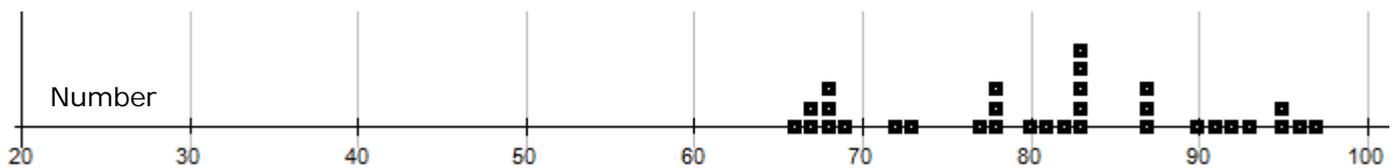
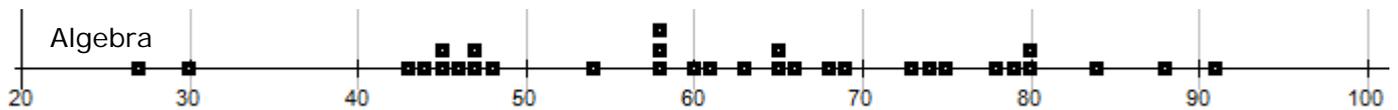


### Routine Box and Whisker Practice #3

Q1 A class sit an Algebra test and a Number test.

Can you say with confidence that they are better at Number than Algebra?

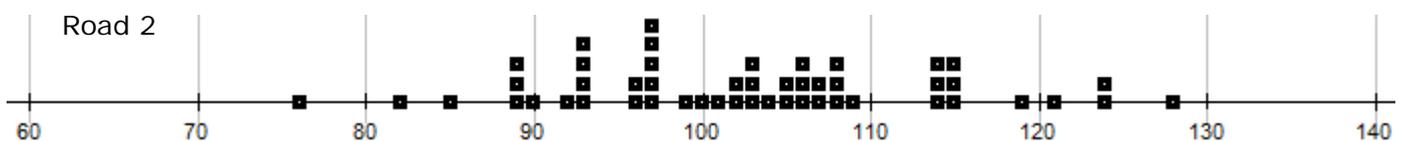
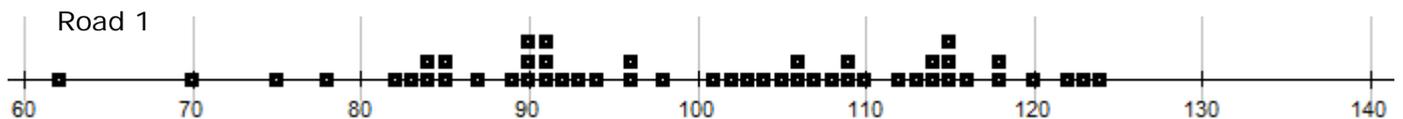
	Algebra	Number
Lowest	27	66
Q1	47	72.5
Median	62	82.5
Q3	74.5	88.5
Highest	91	97
Mean	61.5	81.1



Q2 The numbers of cars are measured on two small country roads for a period of 50 days.

Comment on how the number of cars differ between the roads, and say which is busier.

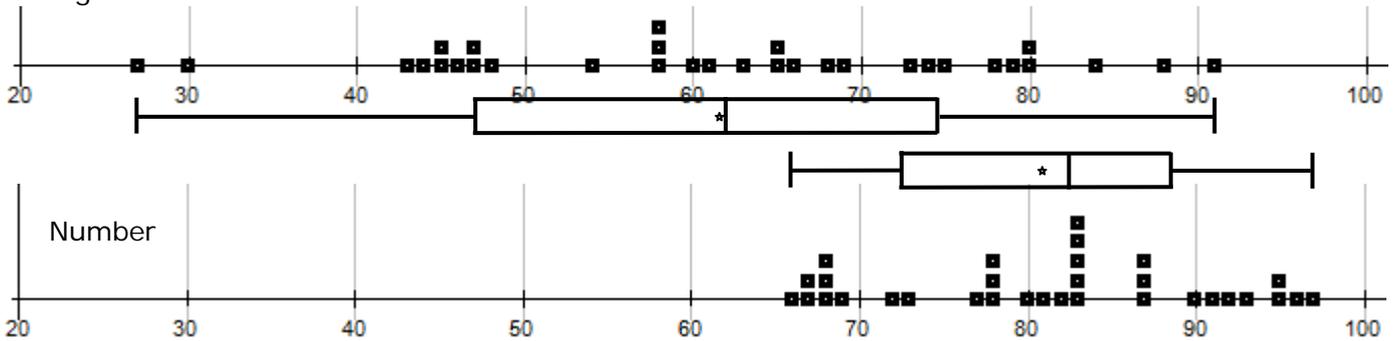
	Road 1	Road 2
Lowest	62	73
Q1	90	96
Median	101.5	103
Q3	113	108
Highest	124	128
Mean	99.7	102.7



**Suggested Answers: Routine Box and Whisker Practice #3**

Q1 Algebra test and Number test.

Algebra



Statistics cannot answer if the class is “better” at one subject than another. In this case it can only talk about whether the results are better in one test or the other.

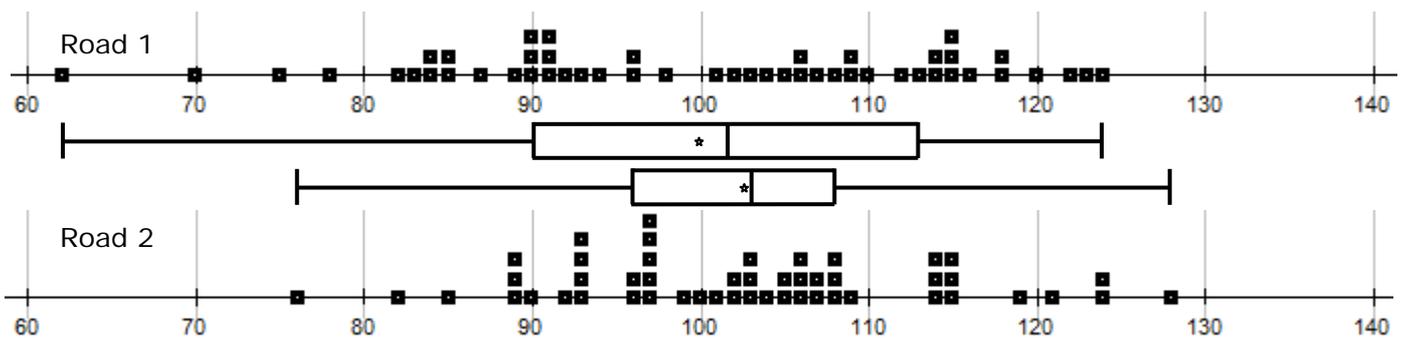
In this case the class did significantly better in the Number test.

- 1) Each point of its box and whisker is higher, very much so for the low values.

The difference seems significant. The median for both are well outside the IQRs of the other. This means it is extremely unlikely that the class scored much better by luck (but it only says they were better at *those tests*, not the topics as a whole.)

- 2) Both distributions are relatively evenly spread and symmetrical – each whisker and box being more or less the same size. There are a couple of extremely low scores in the algebra test, but the whisker is not much larger than the high one, so it is hard to say they are outliers.
- 3) The class was much more consistent with the Number test, with the range and IQR both being very much smaller.

Q2 The numbers of cars.



We cannot say with confidence which road is busier, but there are other differences we can be more confident about.

- 1) While the medians and means show Road 2 as busier, they are too similar to have any confidence that our samples reflect an *actual* difference in a typical day’s traffic. (I lack confidence because the medians for both are well inside the IQRs of the other.)
- 2) Road 2 has a wider range of cars using the road. In particular a typical day on Road 2 is 103 + or – about 7 cars, but for Road 1 it is 101.5 + or – 12 cars, so almost twice the variation in the middle 50%.
- 3) Road 2 has many more days with very few cars, but fairly similar number of busy days.
- 4) Both distributions are fairly even and symmetrical, although Road 2 looks as if it may have two large clumps – at about 90 and about 105 (that is, it may be “bimodal”).