



## “FRAPPY” {Free Response AP Problem...Yay!}

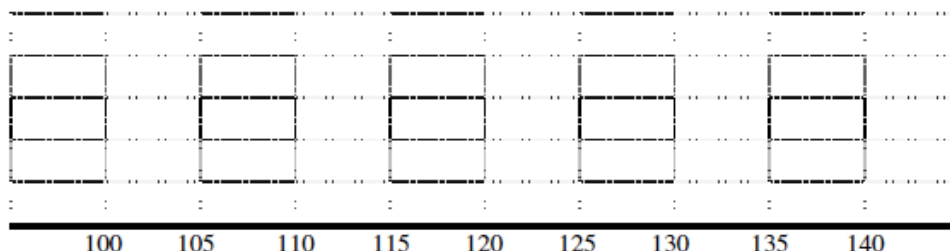
The following problem is taken from an actual Advanced Placement Statistics Examination. Your task is to generate a complete, concise statistical response in 15 minutes. You will be graded based on the AP rubric and will earn a score of 0-4. After grading, keep this problem in your binder for your AP Exam preparation.

A researcher thinks that modern Thai dogs may be descendants of golden jackals. A random sample of 16 animals was collected from each of the two populations. The length (in millimeters) of the mandible (jawbone) was measured for each animal. The lower quartile, median, and upper quartile for each sample are shown in the table below, along with all values below the lower quartile and all values above the upper quartile.

Sample	Values Below $Q_1$	$Q_1$	Median	$Q_3$	Values Above $Q_3$
Modern Thai dog	114, 116, 116, 120	121	125	128	129, 130, 130, 132
Golden jackal	104, 104, 105, 106	107	108	112	114, 122, 124, 125

### Scoring:

- (a) Display parallel boxplots of mandible lengths (showing outliers, if any) for the modern Thai dogs and the golden jackals on the grid below.



Based on the boxplots, write a few sentences comparing the distributions of mandible lengths for the two types of dogs.

- (b) Is it reasonable to use the sample of mandible lengths of modern Thai dogs to construct an interval estimate of the mean mandible length for the population of modern Thai dogs? Justify your answer. (Note: You do not have to compute the interval.)

- (c) Is it reasonable to use the sample data of mandible lengths of modern Thai dogs and the sample data of mandible lengths of golden jackals to perform a two-sample t-test for the difference in mean mandible lengths for the two types of dogs? Justify your answer. (Note: You do not have to conduct the test.)

Total: \_\_/4