Quick start guide for using group and writing center reports produced by Integrity

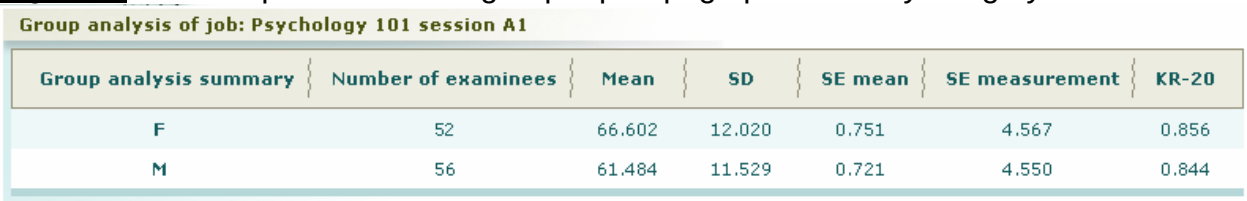
http://integrity.castlerockresearch.com
Castle Rock Research Corp.
November 17, 2005

Using group reports

Group reports are optional reports generated by Integrity. They provide information on groups of students that you have identified, such as males and females. Typically, you would have students fill in their group information (e.g., “Gender: M or F”) on their answer bubble sheets. Then, when submitting the data file to Integrity you, would select the group report option.

When accessing the group report, you would first see the main group report page. An example of a main group report page is shown in Figure 1. As you can see, two groups have been identified: “F” for female students and “M” for male students. In this example, an equal number of males and females took the test and the test mean achieved by the male students was slightly higher than that achieved by the female students. Although there is a visual difference between the means for each group, this does not necessarily mean that there is a statistical difference. A statistically significant difference is a difference between groups that is supported by a statistical difference test, which will be discussed in more detail later in this section. By clicking on one of the groups, you can go into the detailed group report.

Figure 1. An example of the main group report page produced by Integrity.



Group analysis of job: Psychology 101 session A1

Group analysis summary	Number of examinees	Mean	SD	SE mean	SE measurement	KR-20
F	52	66.602	12.020	0.751	4.567	0.856
M	56	61.484	11.529	0.721	4.550	0.844

Figure 2 presents a detailed group report for female students. The detailed group report is composed of five sections:

1) Summary statements
2) Table of statistics for the group
3) Frequency histogram for the group
4) Cumulative percent of total score by group graph
5) Comparison of group means graph

As in other reports within Integrity, the summary statements are designed to highlight patterns and identify relationships in the assessment. The summary statements then direct you to other sections or graphs within the report that would be useful; for

example, the Table of Statistics Summary. An example of the summary statements and Table of Statistics for a group of students is presented in Figure 2. The summary statement in the example indicates that the test scores for this female (represented by an “F”) group of students is relatively normally distributed (e.g., a few students received low scores, the majority of students received middle scores, and a few students received high scores). By examining the statistics in the Table of Statistics section, you can gain more information regarding how the assessment performed for the female group of students (e.g., what the maximum and minimum test scores were for females). The group histogram can be used in similar manner to how it is used in other sections of the reports (e.g., examine the distribution of scores).

Figure 2. An example of a detailed group report produced by Integrity.

Summary: F

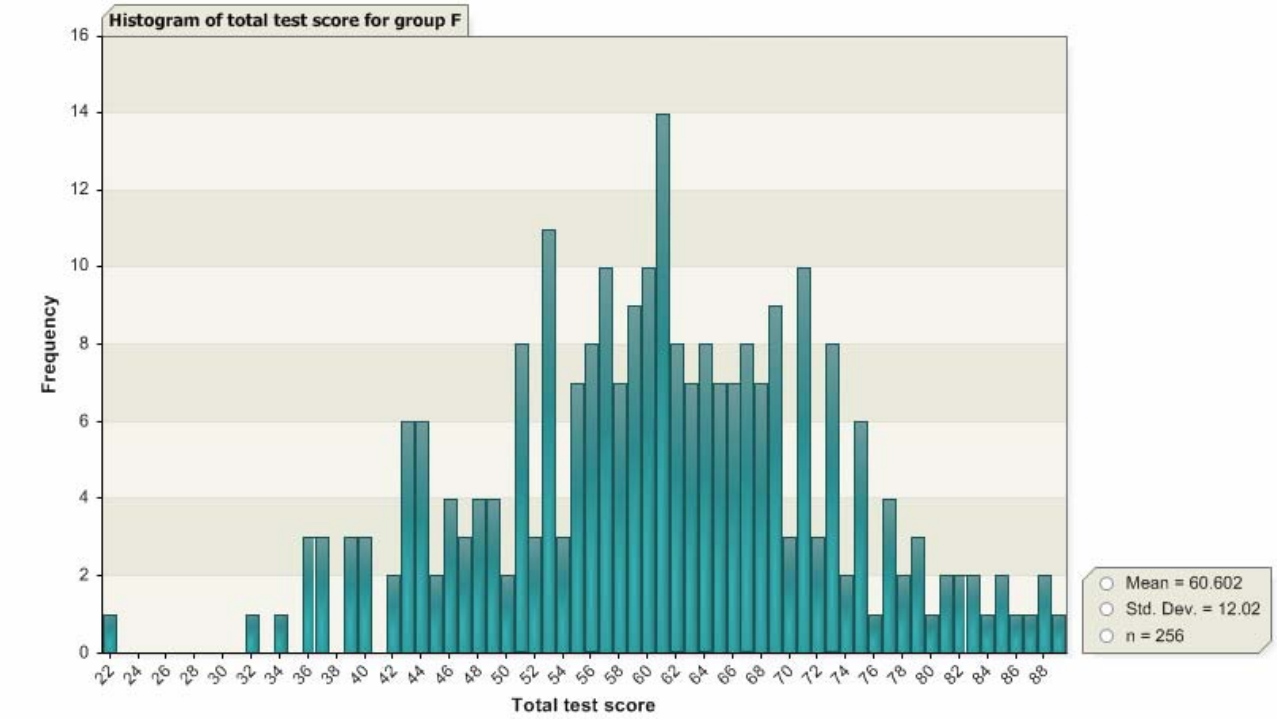
→The skewness and kurtosis statistics indicate that the distribution of scores is relatively normally distributed.

→The means for M and F are likely not statistically significantly different as the 95% confidence bands surrounding each mean do overlap.

Table of statistics for group : F

Number of examinees = 256	**Standard error of mean** = 0.751
Number of items on test = 100	**Standard error of measurement** = 4.567
Mean = 60.602	**KR-20 reliability** = 0.856
Median = 61.000	**Spearman-Brown split-half reliability coefficient** = 0.853
Mode = 61.000	**Spearman-Brown prophecy reliability formula** = 0.920
Standard deviation = 12.020	**Guttman split-half reliability coefficient** = 0.853
Variance = 144.492	**Skewness (total score)** = -0.111
Maximum score = 89	**Kurtosis (total score)** = -0.076
Minimum score = 22	

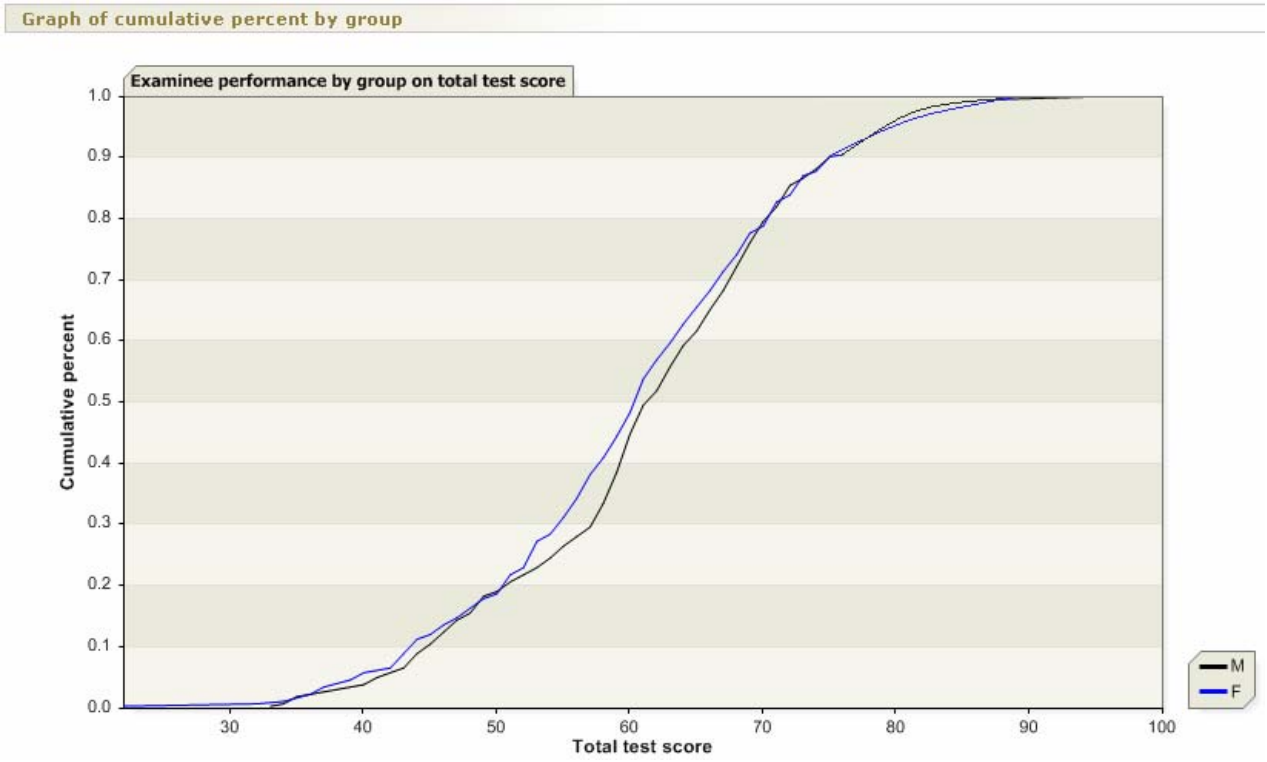
Frequency histogram for group : F



The Cumulative Percent by Group graph, an example of which is shown in Figure 3, provides information on the cumulative percentage of scores that were obtained by each group of students who took the assessment. This graph is usually expected to be an “S-type” curve, where the percentage of low total test scores rises and plateaus in the high score range. This pattern indicates that fewer students received low scores, the majority of students received middle test scores, and few students received high scores. Large plateaus in the graph may indicate problems with the responses from a group in

that there are large gaps in the percentage of students for that group obtaining scores in a particular test score range. For example, if no students in a group obtain scores between 50 and 65 (out of 100 items), causing plateaus to be seen in the graph, this is grounds for concern as it would generally be unexpected that a large number of students would achieve scores in the middle area of the score distribution. This graph can also be used to compare the performance of groups to one another. If the lines on the graph for each group overlap a great deal, then the performance of the groups is very similar. Lines that do not overlap in certain sections of the graph indicate that one group outperformed the other group (the greater the gap in the lines between groups, the more one group outperformed the other).

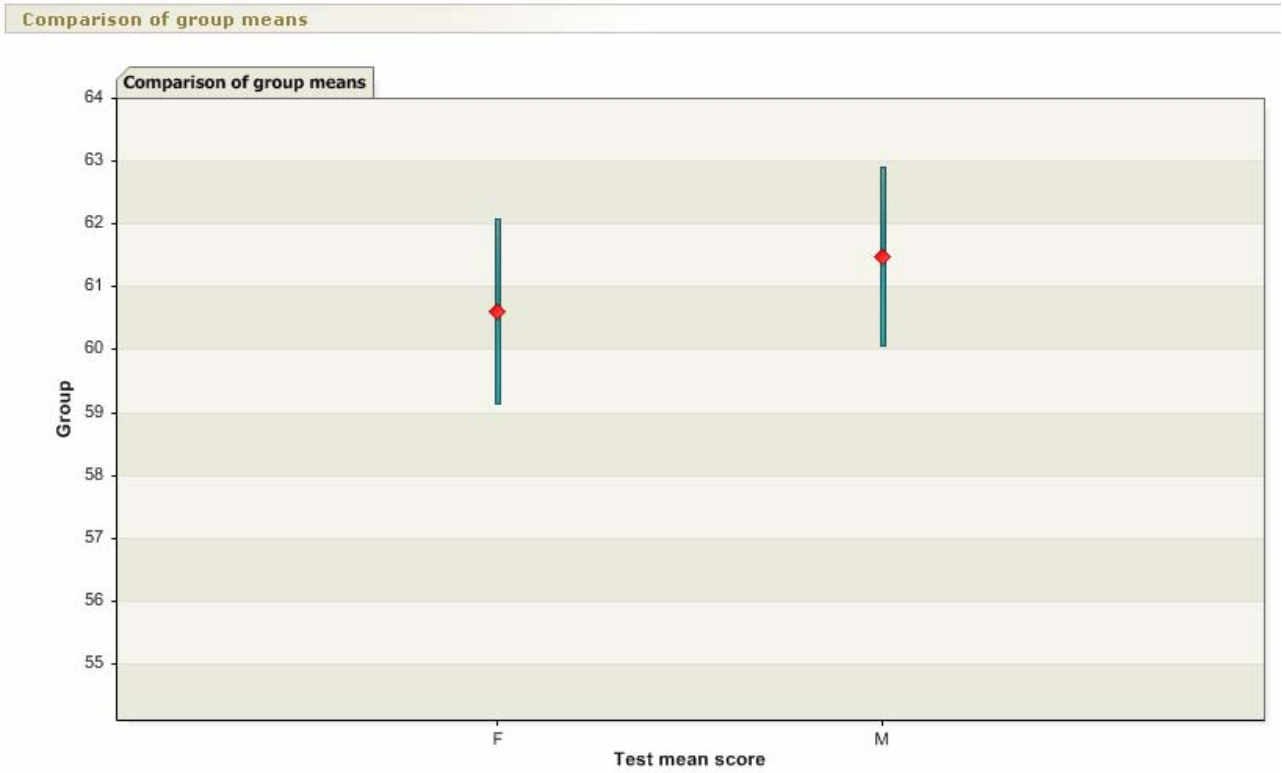
Figure 3. An example of a Cumulative Percent by Group graph produced by Integrity.



The second summary statement in this example indicates that it is unlikely that the mean for the male and female groups are statistically significantly different. From this statement, you could go to the Comparison of Group Means graph shown in Figure 4 below. The red diamond in the middle of each line represents the mean for each group, and the green vertical bars surrounding the mean represent 95% confidence intervals. In general terms, the confidence intervals represents how much uncertainty there is in the estimate of the “true” mean. The narrower the confidence interval, the more precise the estimate of the mean for a group. The 95% refers to how the intervals are calculated and indicate that if many samples are collected and confidence intervals are computed for each sample, then over many samples, approximately 95% of these intervals would contain the true mean. In practical terms, the confidence intervals provide an indication of whether the means are significantly different from one another. If the confidence intervals for two groups overlap (as Figure 4 shows), it is unlikely that there is a

statistical mean difference between the groups. However, if the confidence intervals do not overlap, there is a high likelihood that the means are significantly different. The overlapping of confidence intervals provides a very conservative measure of whether means are similar. To obtain a more accurate measure of mean differences, it is recommended that a t-test or other statistical mean difference test be conducted.

Figure 4. An example of a Comparison of Group Mean graph produced by Integrity.



Using writing center reports

Writing center reports are optional reports generated by Integrity. They provide information on different writing centers (e.g., classes) that you have identified. Typically, you would have students fill in their writing center information (e.g., “Class: 1 2 3”) on their answer bubble sheets. Then, when submitting the data file to Integrity, you would select the writing center report option.

The reports generated for writing centers is similar to those generated for groups. When accessing the writing center report, you would first see the main writing center report page. On this page the writing centers are listed along with several useful pieces of information regarding each writing center. An example of a main writing center report page is shown in Figure 5. As we can see there are three writing centers that have been identified, “Class 1,” “Class 2,” and “Class 3”. The table shows the number of examinees in each class as well as the mean, standard deviation, and other information regarding the performance of each class. We see that the test mean achieved for Class

1 and Class 3 are slightly higher than for Class 2. By clicking on one of the writing centers, you can go into the detailed writing center reports.

Figure 5. An example of the main writing center report page produced by Integrity.

Writing center analysis of job: Psychology 101 session A4

Writing center	Number of examinees	Mean	SD	SE mean	SE measurement	KR-20
Class 1	87	37.016	6.873	0.503	3.487	0.743
Class 2	89	30.640	7.157	0.521	3.499	0.761
Class 3	85	37.355	6.924	0.622	3.482	0.747

Figure 6 presents a detailed writing center report for “Class 1”. The detailed writing center report is composed of five sections:

1) Summary statements
2) Table of statistics for the writing center
3) Frequency histogram for the writing center
4) Cumulative percent of total score by writing center graph
5) Comparison of writing center means graph

As in other reports within Integrity, the summary statements are designed to highlight patterns and identify relationships in the assessment. The summary statements then direct you to other sections or graphs within the report that would be useful; for example, the Table of Statistics Summary. An example of the summary statements and Table of Statistics for a writing center is presented in Figure 6. The summary statement in the example indicates that the test scores for this class is negatively skewed, indicating that a higher density of students obtain high scores than middle or low scores. By examining the statistics in the Table of Statistics section, you can gain more information regarding how the assessment performed for the class of students (e.g., what the maximum and minimum test scores were for this class). The writing center histogram can be used in similar manner to how it is used in other sections of the reports (e.g., examine the distribution of scores).

Figure 6. An example of a detailed writing center report produced by Integrity.

Writing center analysis of Job: Psychology 101 session A4

-- View all --

Summary: Class 1

→The distribution of test scores is highly negatively skewed and therefore not normally distributed. This indicates that there is a higher density of examinees obtaining higher test scores than moderate or high test scores.

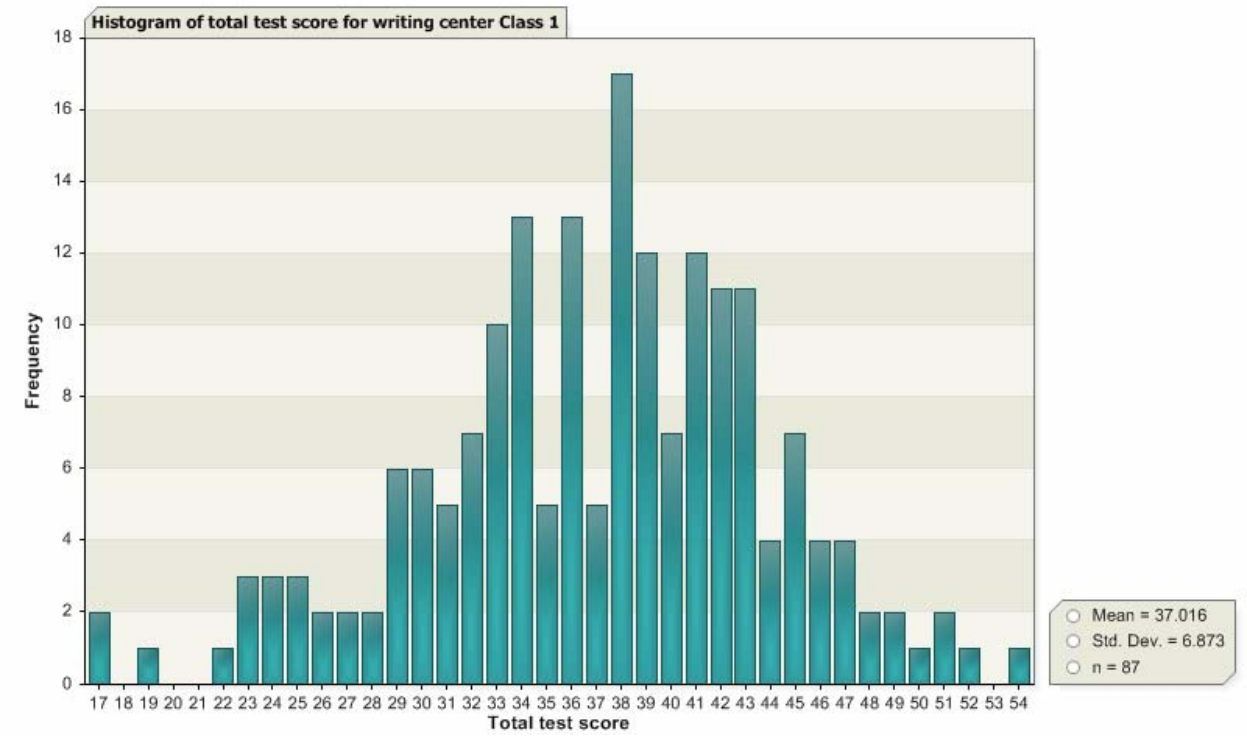
→The means for Class 1 and Class 2 are likely not statistically significantly different as the 95% confidence bands surrounding each mean do overlap.

→The means for Class 1 and Class 3 are likely not statistically significantly different as the 95% confidence bands surrounding each mean do overlap.

Table of statistics for writing center : Class 1

Number of examinees = 87	**Standard error of mean** = 0.503
Number of items on test = 60	**Standard error of measurement** = 3.487
Mean = 37.016	**KR-20 reliability** = 0.743
Median = 38.000	**Spearman-Brown split-half reliability coefficient** = 0.743
Mode = 38.000	**Spearman-Brown prophecy reliability formula** = 0.852
Standard deviation = 6.873	**Guttman split-half reliability coefficient** = 0.744
Variance = 47.242	**Skewness (total score)** = -0.353
Maximum score = 54	**Kurtosis (total score)** = 0.175
Minimum score = 17	

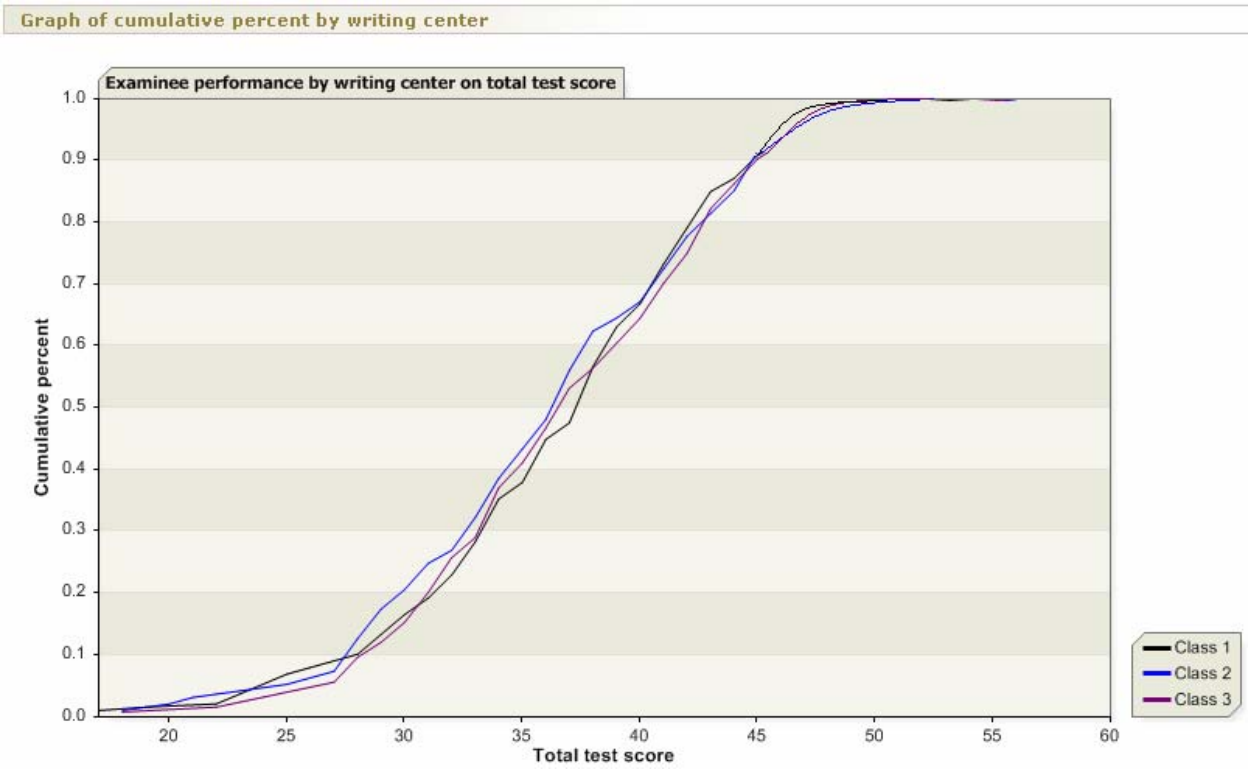
Frequency histogram for writing center : Class 1



The Cumulative Percent by Writing Center graph, an example of which is shown in Figure 7, provides information on the cumulative percentage of scores that were obtained by students in each writing center. This graph is usually expected to be an "S-

type" curve, where the percentage of low total test scores rises and plateaus in the high score range.

Figure 7. An example of a Cumulative Percent by Writing Center graph produced by Integrity.



The second summary statement in this example indicates that it is unlikely that the mean for the Class 1 and Class 2 are statistically significantly different. From this statement, you could go to the Comparison of Writing Center Means graph shown in Figure 8 below. The red diamond in the middle of each line represents the mean for each writing center, and the green vertical bars surrounding the mean represent 95% confidence intervals. In general terms, the confidence intervals represents how much uncertainty there is in the estimate of the "true" mean. The narrower the confidence interval, the more precise the estimate of the mean for a writing center. The confidence intervals provide an indication of whether the means are significantly different from one another. If the confidence intervals for two writing centers overlap (as Figure 8 shows), it is unlikely that there is a statistical mean difference between the writing centers. However, if the confidence intervals do not overlap, there is a high likelihood that the means are significantly different.

Figure 8. An example of a Comparison of Writing Center Means graph produced by Integrity.