1. **B**. Find the mean which is 3. Subtract the mean from each value and square the differences. Add the numbers up and the sum is 10. Divide by 4, and the variance is 2.5. The standard deviation is $\sqrt{2.5} = \sqrt{\frac{5}{2}} = \frac{\sqrt{10}}{2}$.

2. **E**. None of the answers are resistant. Correlation is dependent on means and standard deviations, which are both not resistant.

3. **B**. The mean is 1/p. In this case, $\frac{1}{\frac{10}{35}} = 3.5$. The standard deviation is

$$\sqrt{\frac{1-p}{p^2}} = \sqrt{\frac{1-\frac{10}{35}}{\left(\frac{10}{35}\right)^2}} = 2.958.$$

4. **D**. The formula for sample size is $\left(\frac{z\sigma}{m}\right)^2$. So the answer is

$$\left(\frac{(1.96)(43)}{5}\right)^2 = 284.12 \approx 285.$$

5. **B**. The standard deviation is the square root of the variance. The standard deviation can be equal to zero. Statement III is true.

6. **A**. The formula for chi square is $\sum \frac{(obs - \exp)^2}{\exp}$. The expected values are 20 brown, 12.5 blue, 12.5 red and 10 green. The chi square value is

$$\frac{(21-20)^2}{20} + \frac{(12-12.5)^2}{12.5} + \frac{(10-12.5)^2}{12.5} + \frac{(7-10)^2}{10} = 1.47.$$

7. **C**. Use the formula for conditional probability to obtain $P(A \cap B) = \frac{1}{35}$. Subtract that from P(A) and P(B) to break up the Venn diagram properly. Then find the value on the outside of the circles, which is $\frac{1}{7}$. Then use the proper values to obtain the solution.

$$P(A \mid B') = \frac{P(A \cap B')}{P(B')} = \frac{\frac{9}{35}}{\frac{2}{5}} = \frac{9}{14}.$$

8. **D**. To find the mean, multiply X by P(X) and add the products.
$10(.1) + 12(.2) + 15(.15) + 18(.3) + 22(.12) + 25(.13) = 16.94$

9. **A**. The equation for the line of best fit is $y - \bar{y} = r\frac{S_y}{S_x}(x - \bar{x})$. Plugging the numbers in gives $y - 82 = (.85)\frac{6}{4}(x - 64) \rightarrow y - 82 = \frac{51}{40}(x - 64) \rightarrow y = \frac{51}{40}x + \frac{2}{5}$.

10. **C**. The z-score for the 91 score is 1.31, and the z-score for the 66 score is -.81. You have two equations with two unknowns. They are $\frac{91-mean}{SD}=1.31$ *and* $\frac{66-mean}{SD}=-.81$. Using the process of elimination and solving for the standard deviation gives an SD= $\frac{25}{2.12}$. Plugging in to one of the equations gives you the value for the mean.

11. **D**. Plugging the numbers into a Venn diagram shows that you must subtract 6 from all of the two course numbers for the problem to work properly. So, 7 students take math and computers, 2 take Science and computers and 6 do all 3. 23-15=8.

12. **C**. $P(M \cup C) = P(M) + P(C) - P(M \cap C) = \frac{20}{31} + \frac{23}{31} - \frac{13}{31} = \frac{30}{31}$.

13. **C**. It is a cumulative binomial distribution. The answer is binomcdf (9, .4, 3) which is equal to .482609664, which as a fraction is the answer.

14. **D**. To find the standard deviation for the difference, first multiply the Y standard deviation by 2, to give you 4. Then square 7 and 4, add them up, and take the square root to get your solution.

15. **D**. Different samples give different sample statistics, all of which are estimates for the same population parameter, and so error, is present.

16. **A**. You can set up a proportion involving the rows or the columns of the table. Solving either way gives you the solution.

17. **B**. The formula for a confidence interval is $mean \pm z\frac{\sigma}{\sqrt{n}}$. Plugging in the appropriate values gives $29.4 \pm (1.96)\frac{4}{\sqrt{10}} = 29.4 \pm 2.479225686$. When you simplify, it gives you the answer.

18. **D**. First find the raw score by plugging in the information into the z-score formula as follows: $1.645 = \frac{raw-128}{\frac{15}{\sqrt{100}}} \Rightarrow 2.4675 = raw - 128 \Rightarrow raw = 130.4675$. Then do the z-score again with the new mean: $\frac{130.4675-134}{1.5} = -2.355$. Looking up this z-score in the chart and rounding to two decimal places (-2.36) and using the greater than alternative gets you the solution.

19. **C**. To change the standard deviation from 5 to 3, you must multiply each data point by $\frac{3}{5}$. When you multiply the mean, 76, by this fraction, you get $76\left(\frac{3}{5}\right) = 45.6$. To get up to 85, you must add 39.4, which as a fraction is $\frac{197}{5}$. Therefore, the solution is C.

20. **B**. The total of his first seven tests is 595. The average for these first seven tests is 85. To have at least an 88% average, the total on the 10 tests must be at least 880. 880-595=285. $\frac{285}{3} = 95$.

21. **B**. The factors of 60 are (1,2,3,4,5,6,10,12,15,20,30,60). The mean is 14 and the median is 8. 14-8=6.

22. **A**. The formula for slope is $m = r\frac{S_y}{S_x}$. Plugging the appropriate numbers in gives you $1.2 = r\left(\frac{8}{5}\right) \Rightarrow r = \frac{3}{4}$. The coefficient of determination is r^2, so the answer is given.

23. **C**. Since there are 63% boys, there are 37% girls at the school. The total probability that a student likes to watch football is $(.63)(.85)+(.37)(.56) = .7427$. So the probability that it is a boy is $\frac{(.63)(.85)}{.7427} = \frac{765}{1061}$.

24. **D**. The guidance counselor at the school should be able to give you the class size of every math and science class. You could also check with each individual math and science teacher at the school.

25. **D**. When you use the t-chart to get the critical value, use the 90% column with a df of 24. The critical value from the chart is 1.711. When you plug the numbers into the CI formula, the result is $68.75 \pm \frac{(1.711)(4.20)}{\sqrt{25}} \Rightarrow 68.75 \pm 1.43724 \Rightarrow (67.31276, 70.18724)$. These values are then rounded to the correct answer.

26. **B**. I is false, because increasing the sample size magnifies the bias. The other two statements are true.

27. **C**. Run z-scores for each raw score. $\frac{66-75}{5} = -1.8$ *and* $\frac{87-75}{5} = 2.4$. The four digit decimals in the z chart for -1.8 and 2.4 are .0359 and .9918 respectively. .9918-.0359= .9559, which rounds to .96.

28. **D**. A controlled experiment is the only way to show cause and effect. The other possible answers can show an association, not cause.

29. **A**. The number of education majors at the school is 14256(.15)+16352(.22)=5735.84 The percent of students who are education majors is $\frac{5735.84}{30608} = .1873396759$. When you multiply this percentage times 200, you get 37.4793518, which rounds to 37.

30. **C**. To find the solution, you must realize there are three different ways that each possibility could occur because you don't know which of the three days the bicycle or car occurs. Therefore, the answer is $3(.6)^2(.1) + 3(.3)^2(.6) = .27$.