APPLIED MATHEMATICS 09/02/2016

1) At least one-half of an airplane's engines are required to function in order for it to operate. If each engine independently functions with probability p, for what values of p is a 4-engine plane more likely to operate than a 2-engine plane?

2) A sample of 20 cigarettes is tested to determine nicotine content and the average value observed was 1.2 mg.

(a) Compute a 99 percent two-sided confidence interval for the mean nicotine content of a cigarette if it is known that the standard deviation of a cigarette's nicotine content is 0.2 mg.

(b) Suppose that the population variance is not known in advance of the experiment. If the sample variance is 0.04 mg, compute a 99 percent two-sided confidence interval for the mean nicotine content.

3) A car is advertised as having a gas mileage rating of at least 30 miles/gallon in highway driving. If the miles per gallon obtained in 10 independent experiments are

$$26, 24, 20, 25, 27, 25, 28, 30, 26, 33$$

should you believe the advertisement?