AP Statistics Practice Test
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T4.1 **c.** A census is defined to be measuring all individuals in the population.

T4.2 **e.** Ignore numbers that are larger than 816 or are duplicate numbers.

T4.3 **d.** In order to infer cause and effect, we must run a well-designed experiment. This was an observational study.

T4.4 **c.** This is the definition of a Simple Random Sample.

T4.5 **b.** By randomly assigning treatments we are attempting to make the different groups look as similar as possible so that we can reduce the likelihood of a confounding variable.

T4.6 **b.** It is very difficult to show cause and effect using observational studies. It is much easier in an experiment where the researcher has control over how the treatments are applied.

T4.7 **d.** By stratifying we can control how many people we survey in each of the different kinds of areas.

T4.8 **d.** Bias in the responses means that you are getting responses that are systematically different from the truth

T4.9 **d.** This is a completely randomized design because you randomly assign subjects to one of the four groups. There are two factors: Length of ad (30 seconds or 60 seconds) and Repeat (1 time or 3 times).

T4.10 **b.** In a matched pairs design, the two observations in the pair should be as similar as possible. So use a subjective method for pairing the plots. Once the pairs are chosen, then randomly assign the two treatments to the two plots in the pair.

T4.11 **d.** The teachers who responded likely feel more strongly about the issue and shouldn't be considered to be representative of the entire population of teachers under consideration.

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T5.1 **c.** Probability only tells us what happens approximately in the long run, not what will happen in the short run.

T5.2 **d.** You need exactly 62 of the 100 2-digit numbers to represent the event "having heard of Coca-Cola."

T5.3 **c.** Add the probabilities for 3, 4 and 5 cars.

T5.4 **b.** All 2-digit numbers among the first 10 are between 00 and 97 except 98.

T5.5 **b.** 255 of the 1000 students had a GPA below 2.

T5.6 **c.** There are 285 students who either have a GPA below 2, have skipped many classes or both.

T5.7 **e.** There are 110 students who have skipped many classes. 80 of them have a GPA below 2.

T5.8 **e.** If A and B are independent, then we don't know whether B has occurred if A occurred. But if A and B are mutually exclusive, then if B has occurred then we know that A couldn't have occurred.

T5.9 **b.** P (woman ∪ never married = P (woman) + P (never married)− P (woman ∩ never married)

T5.10 **c.** We want P (first is picture ∩ second is picture ∩ third is picture) = $\left(\frac{12}{52}\right)\left(\frac{11}{51}\right)\left(\frac{10}{50}\right) \approx 0.01$.

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T6.1 **b.** Add the probabilities for the events that X is 3 and 4.

T6.2 **d.** The mean for one person is 2.3 and the mean of the sum for 3 people is the sum of the means.

T6.3 **e.** All other pairs of variables would likely change together (e.g. those who are taller, likely also weigh more).

T6.4 **d.** $Y = 1.5X$, so to get the mean and standard deviation of Y, multiply the mean and standard deviation of X by 1.5.

T6.5 **d.** The mean of the sum of random variables is the sum of the means of the individual random variables.

T6.6 **d.** To find the standard deviation of the sum of random variables, add their variances and take the square root.

T6.7 **c.** In part (a) we are looking for 2 successes, not 1, in part (b) the trials are not independent (not putting the cards back after dealing), in part (d) we have a fixed number of trials and are counting the number of successes (binomial random variable) and in part (e) we have a fixed number of trials and are counting the number of successes (binomial random variable).

T6.8 **b.** This is a binomial setting so the number of cases that hospital has to deal with is a binomial random variable with $n = 17$ and $p = 0.4$. The question is looking for $P(X > 10) = 1 - P(X \leq 10)$

T6.9 **b.** This cannot be a geometric distribution because the bar above $X = 1$ is not the tallest. Using a calculator you can verify that binompdf (8, 0.3, 7) ≈ 0.001224.

T6.10 **c.** This is a geometric random variable and we are looking for $P(X = 5)$.