RAPPY! Scoring Rubric

Use the following rubric to score your response. Each part receives a score of "Essentially Correct," "Partially Correct," or "Incorrect." When you have scored your response, reflect on your understanding the concepts addressed in this problem. If necessary, note what you would do differently on future questions like this to increase your score.

Intent of the Question
The goal of this question is to determine your ability to describe the sampling distribution of a sample mean and use it to perform a probability calculation.

Solution
(a) The sampling distribution of the sample mean length for random samples of 30

advertisements has mean 28 seconds and standard deviation \( \sigma_x = \frac{5}{\sqrt{30}} = 0.913 \) seconds. Because we are told that the population of advertisement lengths is Normally distributed, the shape of the sampling distribution will be Normal.

(b) The probability that a random sample of 30 advertisements will exceed the allotted time is equivalent to the probability that the sample mean length of the 30 advertisements is greater than 900/30 = 30 seconds. In part (a), we determined that the sampling distribution is N(28, 0.913). Therefore, \( P(X > 30) = P\left(Z > \frac{30 - 28}{0.913}\right) = P(Z > 2.19) = 1 - 0.9857 = 0.0143 \)

There is a 1.43% chance the randomly selected advertisements will exceed the allotted time.

Scoring:
Parts (a), (b), and (c) are scored as essentially correct (E), partially correct (P), or incorrect (I).

Part (a) is essentially correct if the response correctly identifies the shape (Normal), center (mean=28 seconds) and spread (standard deviation = 0.913 seconds) of the sampling distribution. The calculation of the standard deviation should be shown to earn an essentially correct score.
Part (a) is partially correct if the solution only identifies 2 of the 3 components correctly or correctly identifies the standard deviation, but fails to show the calculation.
Part (b) is essentially correct if the response sets up and performs a correct probability calculation. Part (b) is partially correct if the response includes a correctly set up calculation, but fails to calculate the correct value OR if it sets up an incorrect, but plausible, calculation but carries it through correctly.
<table>
<thead>
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<th>Score</th>
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| 4     | Complete Response  
Both parts essentially correct |
| 3     | Substantial Response  
One part essentially correct and one part partially correct |
| 2     | Developing Response  
Both parts partially correct  
One part essentially correct |
| 1     | Minimal Response  
One part partially correct |

**My Score:**

**What I did well:**

**What I could improve:**

**What I should remember if I see a problem like this on the AP Exam:**