

Final due Dec 14, 2022 07:30 +08

## Problem 1-1

1/1 point (graded)

Consider deriving the probability of a coin flip coming up heads by running  $m$  trials of 100 flips each. If the coin is fair, the mean probability of the  $m$  trials will go to 0.5 as  $m$  goes to infinity.

☒ True

☐ False



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You have used 1 of 1 attempt

✓ Correct (1/1 point)

## Problem 1-2

0/1 point (graded)

Consider two normal distributions, A and B. The standard deviation of A is 3 and the standard deviation of B is 5. For each distribution, 1,000 observations are drawn and plotted in a histogram with 10 bins, creating one histogram for each distribution.

☒ The rightmost bin of A will have fewer points than the rightmost bin of B.

☐ The rightmost bin of B will have fewer points than the rightmost bin of A.

☐ The rightmost bin of A will have the same number of points as the rightmost bin of B.

☐ Any of the above are possible.



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You have used 1 of 1  
attempt

✖ Incorrect (0/1 point)

## Problem 1-3

1/1 point (graded)

You roll an unfair (weighted) die. The distribution of the numbers rolled is a uniform distribution.

☐ True

☒ False



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You have used 1 of 1  
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✔ Correct (1/1 point)

## Problem 1-4

1/1 point (graded)

A simulation

☐ is useful when describing a system that cannot easily be described mathematically.

☐ is easy to successively refine.

☐ can be used to extract intermediate results.

☒ All of the above

☐ None of the above



Submit

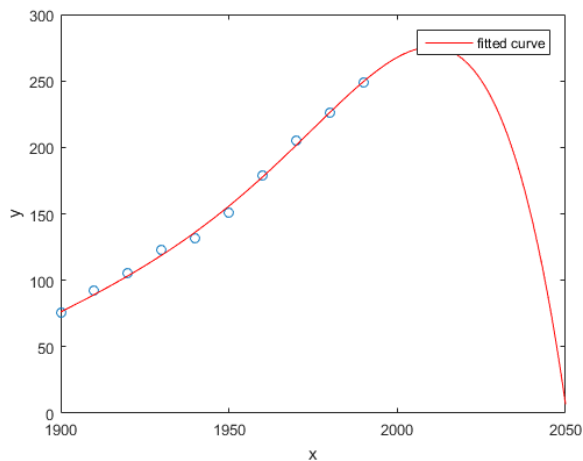
You have used 1 of 1  
attempt

✓ Correct (1/1 point)

## Problem 1-5

1/1 point (graded)

The following image plots the population of the US over time, along with a model fit to the data. This is an example of



☒ overfitting

☐ underfitting

☐ Neither of the above



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You have used 1 of 1  
attempt

✓ Correct (1/1 point)

## Problem 1-6

1/1 point (graded)

If the  $R^2$  of a model produced using linear regression is 0.7, the model accounts for 70% of the variance in the observations.

☒ True

☐ False



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You have used 1 of 1 attempt

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✓ Correct (1/1 point)

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## Problem 1-7

1/1 point (graded)

Given a finite set of data points there exists a polynomial fit such that the polynomial curve goes through each point in the data.

☐ True

☒ False



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You have used 1 of 1 attempt

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✓ Correct (1/1 point)

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## Problem 1-8

1/1 point (graded)

You want to calculate confidence intervals by applying the empirical rule, which requires that you have a normal distribution with a known mean and

standard deviation. Which approach can you use to estimate the mean and standard deviation that you need? Choose all that work.

☒ Central Limit Theorem, which requires that you have many sufficiently large samples from the population

☒ Standard Error, which requires that you have one sufficiently large sample



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You have used 1 of 1 attempt

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✓ Correct (1/1 point)

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## Problem 1-9

5/5 points (graded)

You have a bucket with 4 red balls and 4 green balls. You draw 3 balls out of the bucket. Assume that once you draw a ball out of the bucket, **you don't replace it**. What is the probability of drawing 3 balls of the same color? Answer the question in reduced fraction form - eg 1/5 instead of 2/10.

1/7



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You have used 1 of 5 attempts

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✓ Correct (5/5 points)

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