



**STUDYDADDY**

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**Lab 2 Exercise:** Practice with Statistical Methods: Sex and Death in the Monarch Butterfly

		Female	Male	
<b>Dead Samples</b>	Total Number Measured			
	Average Forewing Length			
	Variance			
<b>Live Samples</b>	Total Number Measured			
	Average Forewing Length			
	Variance			
<b>Mated</b>	Total Number Measured			
	Average Forewing Length			
	Variance			
<b>Single</b>	Total Number Measured			
	Average Forewing Length			
	Variance			
<b>Live</b>	#			
<b>Dead</b>	#			
<b>Live + Dead</b>	#			
				<b>Total (M+F)</b>

**Directions:**

Use the Monarch Butterfly raw data set in excel to answer the following questions. Write cleanly and show all work on the paper (no logical leaps!). For consistency, provide answers with two significant figures after the decimal point.

Note: you will have to use each of the statistical tests introduced in the lecture once (Binomial test, chi-squared( $\chi^2$ ) test, and T-test). If you don't know which one to use, remember data tests can only be used for specific questions/data. For example, the binomial & chi-squared tests can only be used with categorical data; the t - test, with continuous data. If you're stuck between the binomial & chi-squared tests - think about your categories.

**Question 1** (3pts): Was the live sex ratio significantly different from random?

Statistical Test :

Provide Reasoning:

1 or 2 tail (why?):

H0:

HA:

Answer:

**Question 2** (5pts): Is there a significant difference in the mean forewing lengths of mated versus unmated males?

Statistical Test:

Provide Reasoning:

1 or 2 tail (why?):

H0:

HA:

Answer:

**Question 3** (2pts): The wing lengths of mated male butterflies were significantly **smaller (!)** than those from the male population as a whole (“Live Samples”). Given this information, describe the significance of your result from question 2 - According to these data, how does mating relate to wing length in male monarch butterflies?

Answer:

**Question 4** (5pts): Was mortality status independent of sex? (i.e. Were males and females dying at the same rate?)

Statistical Test:

Provide Reasoning:

H0:

HA:

Answer:





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