

Statistics Optional Take-Home Test 2

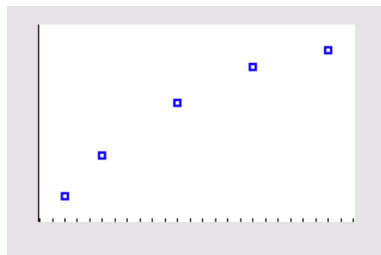
Number of questions—3

Directions: Solve each of the following problems using separate paper, while clearly indicating each problem number when solving. Irrelevant work will detract from your score, while answers without work shown will be awarded no credit. Answers with partially correct work will receive partial credit. Unless otherwise specified, round all answers to 3 decimal places when necessary. You must work alone, but you may use a graphing calculator as a supplement to your own work if you indicate the steps used. You may not use a phone, computer, computational intelligence, AI, or other tools to assist you in solving the problems.

1. How much should a healthy Shetland pony weigh? Let x be the age of the pony (in months), and let y be the average weight of the pony (in kilograms). The following information is based on data taken from *The Merck Veterinary Manual* (a reference used in most veterinary colleges).

x	3	6	12	18	24
y	60	95	140	170	185

A calculator was used to produce a scatter plot and regression equation.



```
NORMAL FLOAT AUTO REAL RADIAN MP
LinReg
y=a+bx
a=55.73170732
b=5.894308943
r²=0.945262448
r=0.9722460841
```

- (a) (8 pts) Describe the association between the variables based on the scatter plot.
- (b) (8 pts) What is the correlation coefficient and how does it help justify the association you described?
- (c) (8 pts) What is the equation of the least-squares line?
- (d) (8 pts) Use the equation of the least-squares line to predict the average pony weight for a 30 month-old pony.
- (e) (8 pts) What kind of prediction did you just make?
- (f) (8 pts) What percentage of the variation in the average pony weight can be explained by the age of the pony?

2. Eddie's is an ice cream parlor with chocolate, vanilla, strawberry, salted caramel, mint chip, and rocky road flavors. They are having a 50% off special, but if you use it the flavor you get is chosen completely randomly. You could even end up getting the same flavor twice if you order two scoops.
- (a) (7 pts) If you use the special and get one scoop, what is the probability you get salted caramel?
 - (b) (7 pts) If you use the special and get one scoop, what is the probability you get salted caramel or rocky road?
 - (c) (7 pts) If you use the special and get two scoops, what is the probability you get chocolate for the first scoop and vanilla for the second scoop?
 - (d) (7 pts) Eddie's also randomly gives out toppings of sprinkles, hot fudge, whipped cream, and cherries. After giving you one topping, they will not give you the same topping again. What is the probability you get whipped cream for your first topping and cherries for your second?
3. A medical test has the following reliability:

	Condition Present	Condition Absent	Total
Positive	24	5	29
Negative	76	95	171
Total	100	100	200

- (a) (12 pts) What is the probability that a test is positive given the condition is absent (a false positive)?
- (b) (12 pts) What is the probability that a test is positive or the condition is present?