

PART 2: PROBLEMS *There are three (3) problems.*

($3 \times 20 = 60$ points).

It is especially important for this mode of examination that for full credit for the PROBLEMS you show your work and justify your answers.

11. (EXCEL) *Do French fries cause cancer?*

A certain chemical 'A' found in French fries concentrates when fried.

a) What is x (independent variable) and what is y (dependent)?

b) Construct a scatterplot of x vs. y

c) Determine the correlation coefficient r .

d) Find equation of least squares line $\hat{y} = a + bx$, and include the line in your scatterplot.

e) Find the predicted concentration of A for a hypothetical frying time of 250 seconds.

Frying time (seconds)	Concentration of A (mgms per kg)
150	155
240	120
260	190
270	185
300	140
375	270

12. Hybrid cars and gender of buyer

The following table of data shows the result of purchases of a Honda Civic.

	Hybrid engine	Not hybrid engine
Male	79	104
Female	64	39

a) Determine the following probabilities.

$$P(\text{male}) =$$

$$P(\text{hybrid}) =$$

$$P(\text{hybrid} \mid \text{female}) =$$

$$P(\text{female} \mid \text{hybrid}) =$$

b) Are the two events *buying a hybrid* and *being a female purchaser* independent or dependent events?

c) Write in words an interpretation of $P(\text{female} \mid \text{hybrid})$.

d) Determine the probability that a given man does *not* buy a hybrid.

13. *Waiting time for trains.*

If x is the waiting time for a train beyond its scheduled departure time, then the density distribution for x is uniform with height $\frac{1}{10}$ on the interval 0 to 10 minutes. The density graph looks like the following: notice that the total area under the graph (the blue part) equals 1.



- a) Is the random variable x continuous or discrete?
- b) What is the probability that at most 6 minutes passes before the train arrives?
- c) What is the probability that a waiting time is between 3 and 5 minutes?
- d) Which is greater: the probability that a waiting time is less than 3 minutes, or the probability that a waiting time is greater than 8 minutes?
- e) Are the two probabilities $P(2 < x < 7)$ and $P(2 < x \leq 7)$ equal?

