

MATH 1030-006
First Midterm

Name: _____ ID: U _____

Question:	1	2	3	4	5	Total
Points:	20	20	20	20	20	100
Score:						

1. (20 points) If necessary, put the following statements in the form '*If p, then q*'. Is it an *Inductive* or *Deductive* argument? If Deductive, then draw the Venn-diagram and check the *Validity* of the argument. Also, check if it is *Sound*.

Premise: Novels written in the 19th century were not written on a word processor.
Premise: Jake finished his first novel in 2009.
Conclusion: Jake's first novel was written on a word processor.

2. (20 points) Use these facts in the following exercises: Solar cells convert sunlight directly into electricity. If solar cells are $P\%$ efficient, then they generate $10P$ watts of *power* per square meter of surface area when exposed to direct sunlight, for example, 15% efficient solar cells generate 150 watts of power per square meter surface area when exposed to direct sunlight.

Suppose a 1 square meter panel of solar cells has an efficiency of 20% and receives the equivalent of 6 hours of direct sunlight per day. How much energy, in Joules, can it produce each day? What average power, in watts, does the panel produce?

3. (20 points) Two cars, 360 kilometers apart, begin driving toward each other on a long, straight highway. One car travels 80 kilometers per hour and the other 100 kilometers per hour. At the same time, a canary, starting on one car, flies back and forth between the two cars as they approach each other. If the canary flies 120 kilometers per hour and spends no time to turn around at each car, how far has it flown when the cars collide?

4. (20 points) Your dinner bill is \$42.50. You leave \$50. What percent tip did you leave? (Ignore taxes in this question.)

5. (20 points) State whether the following statement is true or false, and explain why. If the statement is false, state the true change:

A high school reports that its students' SAT scores were down by 20% for one year. The next year, however, SAT scores rose by 30%. The high school principal announces, "Overall, test scores have improved by 10% over the past two years."