

1. 10 pts. Determine whether the argument is valid using a truth table:

$$\begin{array}{l} p \leftrightarrow q \\ q \rightarrow r \\ \hline \therefore \neg r \rightarrow \neg p \end{array}$$

2. 15 pts. Translate the argument into symbolic form, then determine whether the argument is valid using a truth table: “If the prescription was called in to Big Pharma Pill-o-Rama, then you can pick it up by tea time. You cannot pick it up by tea time. Therefore, the prescription was not called in to Big Pharma Pill-o-Rama.”
3. 15 pts. Translate the argument into symbolic form, then determine whether the argument is valid using a truth table: “If the car has a sound system, then Gomez will buy the car. If the price is not less than \$18,000, then Gomez will not buy the car. Therefore, if the car has a sound system, then the price is less than \$18,000.”

4. 10 pts. each Use an Euler diagram to determine whether the syllogism is valid.

- (a) No poodles are noodles.  
No noodles have common sense.  

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∴ No poodles have common sense.
- (b) All plumbers wear overalls.  
Some electricians wear overalls.  

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∴ Some electricians are plumbers.
- (c) Some clowns are scary people.  
Some scary people are fascists.  
All fascists are clowns.  

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∴ Some fascists are not scary people.

5. 5 pts. each In a given week a veterinarian treated 56 dogs, 45 cats, 12 parakeets, and 7 ferrets.

- (a) Determine the empirical probability that the next animal she treats is a cat.  
(b) Determine the empirical probability that the next animal she treats is a ferret or a dog.

6. 10 pts. A traffic light is red for 25 sec, yellow for 5 sec, and green for 55 sec. What is the probability that when you reach the light it will be yellow?

7. 10 pts. One card is selected at random from a deck of cards. Find the probability that the card selected is a card greater than 3 and less than 9.

8. 10 pts. One card is selected at random from a deck of cards. Find the probability that the card selected is not a 5.
9. 10 pts. A six-sided die is tossed. Find the odds against rolling a number less than 3.
10. 10 pts. The odds in favor of Morticia winning a funny hat are 15:4. Find the probability that Morticia wins the funny hat.
11. 10 pts. A 16-sided die is rolled once. If an even number comes up you win \$8; if a 1 or 3 comes up you lose \$6; if a 5, 7, 9, or 11 comes up you lose \$2; if a 13 comes up you lose \$40; and if a 15 comes up you break even. What's your expected value if you play this game?
12. Two thousand raffle tickets are sold for \$3 each. Three prizes will be awarded: one for \$1000 and two for \$500. Professor Chalkdust purchases one of these tickets.
- (a) 10 pts. Determine the professor's expected value.
- (b) 5 pts. Determine the fair price of a ticket.