

MATH 1030, Review for Exam 1

Name:

I. Venn Diagrams and Arguments

For problems 1-5, draw and label a Venn diagram for the given statement.

1. Some philosophers did not live in Greece.

2. Herman hates spiders.

3. Cheaters never prosper.

4. Some teenagers are responsible drivers.

5. All widows are women.

6. Guy Flannel is an avid ornithologist. On one day of bird watching, he decides to investigate the relationship between the characteristics in the birds he observes. He gathers the following information about the 37 birds he sees:

- a total of 14 seed-eating oscines (songbirds)
- a total of 5 seed-eating red birds
- a total of 15 oscines that are not red
- 4 red, seed-eating oscines
- a total of 26 oscines
- a total of 18 seed-eating birds
- a total of 14 red-colored birds

(a) Draw a Venn diagram to illustrate his findings. Clearly label each region and the number of birds associated with each region.

(b) What is the maximum number of eagles Guy could have seen?

For problems 7-10, determine whether the argument is inductive or deductive. If it is inductive, explain why it is strong or why it is weak. If the argument is deductive, draw the appropriate Venn diagram and determine whether it is valid or invalid. If it is valid, determine whether it is sound.

7. Premise: If you swallow food and talk at the same time, you will choke.
Premise: Ted is choking.
Conclusion: Ted must have swallowed food and talked at the same time.

8. Premise: All great basketball players must wear expensive shoes.
Premise: Shaquille O'Neal is a great basketball player.
Conclusion: He must wear expensive shoes.

9. Premise: Every winter it has snowed in Utah for all recorded history.
Conclusion: It will snow in Utah this coming winter.

10. Premise: If you like the book, then you'll love the movie.
Premise: You did not like the book.
Conclusion: You will not love the movie.

II. Unit Conversions

1. Convert 12 decimeters into decameters.
2. How many joules are in one kilowatt-hour (1 watt = 1 joule/second)?
3. Convert 25 miles per hour into meters per second (1 mile = 1.6 kilometers).
4. Convert 8 grams per milliliter into grams per 100 milliliters.
5. Suppose you bought an imported Italian car but are concerned about its gas mileage. When you fill up its 15.8 gallon gas tank, the odometer reads 1500 kilometers, and when you need to refuel, the odometer reads 2,110.26 kilometers. What is your car's gas mileage, in miles per gallon? Remember that there are 0.621371192 miles in one kilometer.
6. Scientists come through for once and discover that it takes 417 licks to get to the center of a Tootsie roll pop. If you lick at the rate of 53 licks per minute and your friend licks at the rate of 79 licks per minute, how many more seconds will it take you to finish your lollipop than your friend?

7. A new coal-burning power plant can generate 1.5 gigawatts (billion watts) of power. Burning 1 kilogram of coal yields about 450 kilowatt-hours of energy.
- (a) How much energy, in kilowatt-hours, can the plant generate each month? (Assume that there are 30 days in a month.)

 - (b) How much coal, in kilograms, is needed by this power plant each month to generate this much energy?

 - (c) If a typical home uses 1000 kilowatt-hours per month, how many homes can the power plant supply?
8. China has a population of 1,321,851,888 people (July 2007 estimate). If the birth rate is 13.45 births per 1,000 population per year and the death rate is 7 deaths per 1,000 population per year, what will China's population be next year?
9. Suppose you own an aquarium 36 in. long, 15 in. wide, and 18 in. high. How many gallons of water can it hold? (Hint: There are 7.48 gallons in one cubic foot.)

10. You're a paramedic behind the wheel of an ambulance and need to drive to the scene of an accident 34 blocks away. If you need to get there within 15 minutes, how fast do you need to drive, in miles per hour? (Assume that there are 12 blocks in one mile.)

III. Percentages

Gender	Elementary and middle school teachers	Secondary teachers
Men	562,113	499,098
Women	2,380,887	658,902

1. What percentage of all secondary teachers are female?
2. What percentage of all elementary, middle school, and secondary teachers are male?
3. If there were 480,778 male elementary and middle school teachers in the previous year, by what percent did the number of male elementary and middle school teachers change?
4. If a 34 ounce can of olives is 183% more money than a 12 ounce can of olives, which is a better deal? Explain.
5. Suppose my salary is cut by 17%, but then the following year I receive a raise of 20%. Am I making more money than before? Explain.