

Homework #2

Instructions: Answer the following questions on a **separate sheet of paper**.

1. Consider the following deductive argument:

Premise 1: Everyone who has blood type AB negative works at a bakery.

Premise 2: Hobbie has blood type AB negative.

Conclusion: Therefore, Hobbie must work at a bakery.

(a) Determine whether the argument is valid or invalid. Explain your answer using a Venn diagram.

(b) If the argument is valid, is the argument sound?

2. Consider the following deductive argument:

Premise 1: If you propose to your partner by offering a ring from Julius Jewelry Store, your partner will unequivocally accept the engagement.

Premise 2: Jessica Alba recently accepted Doug Jones' proposal for marriage.

Conclusion: Doug Jones went to Julius.

(a) Determine whether the argument is valid or invalid. Explain your answer using a Venn diagram.

(b) If the argument is valid, is the argument sound?

3. A solder is a metal substance which has a particularly low melting point, and is appropriate for joining metal surfaces, such as wiring to the surface of a printed circuit board.

(a) Of all known solders which can be made with tin, a particular mix of tin and lead, often called a eutectic mixture, has the lowest melting point. The minimum melting temperature of 183° Celcius occurs with a 63/37 mix of lead and tin. What is this minimum melting point in degrees Fahrenheit?

(b) Concerned environmental groups and government agencies are becoming increasingly aware of the accumulation of lead in landfills caused by the solder in the circuits of discarded consumer electronics, especially since the expected life-spans of such products has decreased steadily in recent years. This has prompted the European Union to adopt the Restriction of Hazardous Substances Directive (RoHS) which, in particular, mandates the elimination of lead from electronics. A common lead-free solder, which may be used as a replacement for a tin/lead solder, is made up of tin, silver, and copper, and has a melting point of 425 degrees Fahrenheit. What is the melting point of this lead-free solder in degrees Celsius?

4. Herman is shopping online for a car and found a car manufactured in Europe that supposedly gets 18 kilometers per liter. How many miles per gallon does Herman's dream car get?

(Recall that 1 mile = 1.61 kilometers and that 1 gallon = 3.785 liters)

5. In the year 2065, it has been predicted that the moon will be a vacation spot for people that are well to do, that moon rock sales will be at an all time high, that the price of moon rocks will be 313 moonies per kilogram, and that 1 US dollar will be worth 14.4 moonies.

Suppose that Cynthia goes to the moon for spring break in the year 2065 and that the above predictions are correct. At the end of a week's worth of moon site-seeing, Cynthia stops by a gift shop to pick up moon rocks for her friends and family back on earth.

- (a) Help Cynthia by calculating the price of moon rocks in dollars per pound.
(Recall that 1 kilogram = 2.2 pounds.)
- (b) How many dollars will it cost Cynthia to purchase 10 pounds of moon rocks?

6. Felix is a quilt fanatic! He loves to make quilts, admire quilts, and (of course) use quilts. Recently, Felix attended a meeting of the Mexico City Quilting Guild and has since become extremely interested in Mexican quilts. While at the meeting, he obtained a few typical Mexican quilt patterns. When he got back to the states, he headed straight over to the fabric store to see what he could find. Unfortunately, Felix couldn't remember how to convert from meters to yards and his favorite pattern called for 2.2 square meters of a particularly elegant fabric. Give Felix a hand and calculate how many square yards of that fabric he needs to buy.

(Recall that 1 meter = 3.28 feet and that 3 feet are in a yard.)