

Warm-Up: Zeno's Furniture

Prepared by Mark on April 4, 2025

Instructor's Handout

This handout contains solutions and notes.

Recompile without solutions before distributing.

Zeno's Furniture sells exactly five types of furniture:
Footstools, Hutches, Sideboards, Tables, and Vanities.

Each can be made of exactly one kind of wood:
Maple, Oak, Pine, or Rosewood

Irene buys four items, each of a different type.
The following conditions govern Irene's purchases:

- Any vanity she buys is Maple.
- Any rosewood item she buys is a sideboard.
- If she buys a vanity, she does not buy a footstool.
- If she buys a footstool, she also buys a table made of the same material.
- Irene does not buy an oak table.
- Exactly two of the items she buys are made of the same kind of wood.

Problem 1:

Which one of the following could be an accurate list of the items Irene buys?

- maple footstool, maple hutch, rosewood sideboard, maple table
- oak hutch, rosewood sideboard, pine table, oak vanity
- rosewood hutch, maple sideboard, oak table, maple vanity
- pine footstool, rosewood sideboard, pine table, maple vanity
- maple footstool, pine hutch, oak sideboard, maple table \Leftarrow this one

Problem 2:

If Irene buys one item made of rosewood and two items made of maple, then which one of the following pairs could be two of the items she buys?

- a rosewood sideboard and an oak footstool
- an oak hutch and a pine sideboard
- an oak hutch and a maple table \Leftarrow this one
- a maple sideboard and a maple vanity
- a maple hutch and a maple table

Problem 3:

Which one of the following is a complete and accurate list of all the woods any footstool that Irene buys could be made of?

- maple, oak
- maple, pine \Leftarrow this one
- maple, rosewood
- maple, oak, pine
- maple, oak, pine, rosewood

Problem 4:

Suppose Irene buys a footstool. Then which one of the following is a complete and accurate list of items and any one of which she could buy in maple?

- footstool, hutch, sideboard, table, vanity
- footstool, hutch, sideboard, table \Leftarrow this one
- footstool, hutch, sideboard
- footstool, hutch
- footstool

Problem 5:

Which one of the following cannot be the two items Irene buys that are made of the same wood as each other?

- footstool, hutch \Leftarrow this one
- hutch, sideboard
- hutch, table
- sideboard, vanity
- table, vanity

Problem 6:

If Irene does not buy an item made of maple, then each of the following must be true except...

- Irene buys a footstool
- Irene buys a pine hutch \Leftarrow this one
- Irene buys a rosewood sideboard
- Irene buys exactly one item made of oak
- Irene buys exactly two items made of pine

Problem 7:

Suppose the condition that Irene does not buy an oak table is replaced with the condition that she does not buy a pine table. If all the other conditions hold as originally given, which of the following cannot be true?

- Irene buys an oak footstool.
- Irene buys a hutch and a table made of the same wood.
- Irene buys a vanity, but she does not buy an oak table.
- Irene buys a maple table and an oak hutch.
- Irene buys a rosewood sideboard and exactly two items made of pine. \Leftarrow this one