

Objective

In this lesson, you will:

- Solve a linear system by using an algebraic method.



SCENARIO In 2003, there were approximately 28,179.4 million barrels of oil being produced in the world. In 1965, there were approximately 15,856 million barrels of oil being produced in the world.

Key Term

- linear system

Problem 1 Supply and Demand

- A. What is the rate of change in the amount of oil being produced in millions of barrels per year from 1965 to 2003? Show all your work and use a complete sentence in your answer. Round your answer to the nearest tenth, if necessary.
- B. The amount of oil being produced is called the *supply* of oil. Write an equation that gives the supply in millions of barrels in terms of the number of years since 1965. Assume that the rate of change in the supply is the same as the rate of change from 1965 to 2003. Be sure to define your variables. Show all your work and use complete sentences in your answer.
- C. The amount of oil that the world uses is called the *demand* for oil. In 1965, the demand was approximately 15,179 million barrels per year and was increasing at a rate of 360.1 million barrels per year. Write an equation that gives the demand in millions of barrels in terms of the number of years since 1965. Be sure to define your variables and use a complete sentence in your answer.

Investigate Problem 1



1. In which year was the supply 18,000 million barrels? Show all your work and use a complete sentence in your answer.
2. In which year will the supply be 30,000 million barrels? Show all your work and use a complete sentence in your answer.
3. Find the demand in 1975. Show all your work and use a complete sentence in your answer.
4. Find the demand in 2010. Show all your work and use a complete sentence in your answer.
5. In which year was the demand 18,000 million barrels of oil? Show all your work and use a complete sentence in your answer.

Investigate Problem 1

12. Complete the table of values below that shows the supply and the demand for different numbers of years.

Quantity Name	Years since 1965	Supply	Demand
Unit	years	million barrels	million barrels
Expression			
	x		
	1		
	10		
	40		
	50		

13. Use the table to decide whether the supply was ever the same as the demand. Use a complete sentence to explain your reasoning.

If so, determine the number of years that will pass before the supply and demand will be equal. Show all your work and use a complete sentence in your answer.

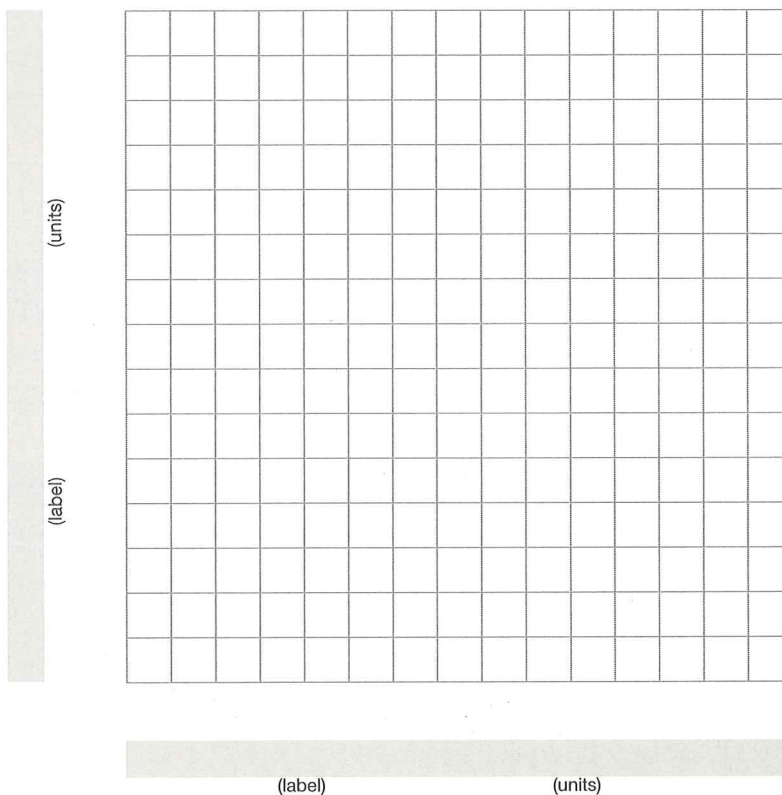
How did you find your answer? Use a complete sentence to explain.

What was the amount of oil when the supply and demand were equal? Show all your work and use a complete sentence in your answer.

Investigate Problem 1

14. Check your estimate by creating a graph of your linear system on the grid below. First, choose your bounds and intervals. Be sure to label your graph clearly.

Variable quantity	Lower bound	Upper bound	Interval



Is your estimate confirmed by your graph?

15. Do you think that your equations are accurate models for your data? Use complete sentences to explain your reasoning.



