

Solving Linear Systems by Substitution

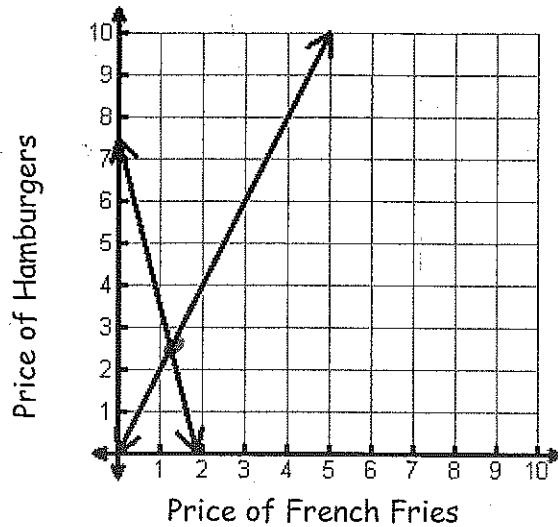
Explore - Day 1

Name _____

Date _____

Period 5

The concession stand at the football game is selling french fries and hamburgers. The price of a hamburger is the same as the price of two orders of fries. YoonJi spent \$7.50 and bought four orders of fries and one hamburger. The system $\begin{cases} h = 2f \\ 4f + h = 7.50 \end{cases}$ represents this situation, where h is the price of the hamburger and f is the price of the fries.



1. Using the graph, is it possible to determine the exact price YoonJi paid for each hamburger and each order of fries? Why do you say that? No, the intersection is not a pretty point

2. If she decided not to order a hamburger and will substitute fries instead. How many orders of fries can she get to replace the hamburger? Why do you say that?

2 fries replace the hamburger because $2f = 1h$ price is same

3. Rewrite the second equation replacing the one hamburger with the two fries

original: $4f + h = 7.50$

new: $4f + 2f = 7.50$

$h = 2f$ substitute h

4. Solve the equation from #3. What does the solution represent in this situation?

$6f = 7.50$
 $f = 1.25$

This means it costs \$1.25 per order of french fries.

5. What is the price of one hamburger? How did you determine the price?

$h = 2f$
 $h = 2(1.25)$

$h = 2.50$

\$2.50 per hamburger

6. Write the solution as an ordered pair. How does this compare with the solution from the graph?

$(1.25, 2.50)$

You just solved a system of equations using a process called substitution. The goal when using substitution is to combine parts of the two equations to create one equation with one variable. Then you can solve this equation using methods with which you are already familiar.

Let's practice! Solve the system using substitution.

7. $\begin{cases} x + y = 3 \\ y = 6 \end{cases}$

$$\begin{array}{r} x + 6 = 3 \\ \underline{-6 \quad -6} \\ x = -3 \end{array}$$

$(-3, 6)$

8. $\begin{cases} x = -5y + 4 \\ 3x + 15y = -1 \end{cases}$

$$\begin{aligned} 3(-5y + 4) + 15y &= -1 \\ -15y + 12 + 15y &= -1 \\ 12 &\neq -1 \end{aligned}$$

★ No Solution

9. $\begin{cases} y = 3x - 4 \\ 6x - 2y = 8 \end{cases}$

$$\begin{aligned} 6x - 2(3x - 4) &= 8 \\ 6x - 6x + 8 &= 8 \\ 8 &= 8 \end{aligned}$$

★ Infinitely many solutions