Name Key

Algebra 1 Systems of Equations Study Guide

Solve each system by the **Substitution Method.**

1) $y = x + 2$
$2x + y = 17$

$2x + x + 2 = 17$
$3x + 2 = 17$
$3x = 15$
$x = 5$

$y = 5 + 2$
$= 7$
$(5, 7)$

2) $3y - x = -9$
$2y + 5x = 11$

$-x = -3y - 9$
$x = 3y + 9$

$2y + 5(3y + 9) = 11$
$2y + 15y + 45 = 11$
$17y + 45 = 11$
$17y = -34$
$y = -2$

$x = 3(-2) + 9$
$x = -6 + 9$
$= 3$
$(3, -2)$

3) $y = 3x - 7$
$6x - 2y = 12$

$6x - 2(3x - 7) = 12$
$6x - 6x + 14 = 12$

No Solution

Solve each system by the **Elimination Method.**

4) $12x + 3y = 18$
$-5x + 3y = -4$

$7x = 14$

$x = 2$

$12(2) + 3y = 18$

$24 + 3y = 18$

$3y = -6$

$y = -2$

$(2, -2)$

5) $(2x - 7y = 41) \cdot 3$
$6x + 5y = -7$

LCM$_x$: 6

LCM$_y$: 35

$6x + 21y = -123$
$-(6x + 5y = -7)$

$26y = -130$

$y = -5$

$2x - 7(-5) = 41$

$2x + 35 = 41$

$-35 \quad -35$

$2x = 6$

$x = 3$

$(3, -5)$

6) $3x - 2y = 16$
$5x + 2y = 8$

$8x = 24$

$x = 3$

$3(3) - 2y = 16$

$9 - 2y = 16$

$-9 \quad -9$

$-2y = +7$

$y = -\frac{7}{2} = -3.5$

$(3, -\frac{7}{2})$

$3(3) - 2(3.5) = 16$

$9 - 7 = 16$

Solve using any method you choose.

7) A youth group and their leaders visited Mammoth Cave. Two adults and 5 students in one van paid $77 for the Grand Avenue Tour of the cave. Two adults and 7 students in another van paid $95 for the same tour. Find the adult price and the student price for the tour.

Define Variables

x = adult price
y = student price

Equations

$2x + 5y = 77$
$-2x + 7y = 95$

$-2y = -18$
$\frac{-2y}{-2} = \frac{-18}{-2}$
$y = 9$

$2x + 5(9) = 77$
$2x + 45 = 77$
$2x = 32$
$x = 16$

Adult tix are $16 and student tix are $9.

8) At an after season sale on winter clothes, I found a bunch of really cute hats and scarves. I decided to buy two hats and two scarves for myself to have for next year. I spent $60. When I told my friends about the sale, they asked me to go back and get something for them. I ended up spending $44 on one hat and two more scarves. What was the price of a single hat and a single scarf?

Define variables:

x = hats
y = scarves

A single hat costs $16 and a scarf costs $14.

Equations:

$2x + 2y = 60$
$x + 2y = 44$

$x = -2y + 44$

$x = -2(14) + 44$
$= -28 + 44$
$= 16$

$2(-2y + 44) + 2y = 60$
$-4y + 88 + 2y = 60$
$-2y + 88 = 60$
$-88 \quad -88$
$-2y = -28$
$y = 14$