Algebra 2

Ch. 3 Handout 3.2

Solving systems Algebraically

Not every system can be solved easily bygraphing. Although you can graph eachline easily, the exact point of intersection is not obvious.

Substitution and **Elimination method** allows you to find exact solution

1. Solve the system by substitution

$$3x + y = -9$$
$$-3x - 2y = 12$$

STEPS

1. Solve for one of the variables
2. Substitute the expression into the other equation for the correct variable.
3. Substitute the value into either equation and solve for the other unknown.
4. Check your solutions

① $3x + y = -9$

$y = -3x - 9$

② $-3x - 2y = 12$

$-3x - 2(-3x - 9) = 12$

$-3x + 6x + 18 = 12$

$3x + 18 = 12$

$3x = -6$

$x = -2$

③ $y = -3x - 9$

$y = -3(-2) - 9$

$y = 6 - 9$

$y = -3$

$x = -2$

$y = -3$

Check

$3(-2) + -3 = -9$

$-3(-2) - 2(-3) = 12$

Solve the system by substitution:

$$3x - y = 10$$

$$2x - 3y = 9$$

$3x - y = 10$

$-3x \quad -3x$

$-y = -3x + 10$

$y = 3x - 10$

$2x - 3y = 9$

$2x - 3(3x - 10) = 9$

$2x - 9x + 30 = 9$

$-7x + 30 = 9$

$-7x = -21$

$x = 3$

$y = 3x - 10$

$y = 3(3) - 10$

$y = 9 - 10$

$y = -1$

$x = 3$

$y = -1$

$3(3) - (-1) = 10$

$2(3) - 3(-1) = 9$

2. At Renaldi's Pizza, a soda and two slices of the pizza-of-the-day costs $10.25. A soda and four slices of the pizza-of-the-day cost $18.75. Find the cost of each item.

soda = x

pizza = y

cost of a soda = $1.75

cost of one pizza slice = $4.25

$x + 2y = 10.25$

$x + 4y = 18.75$

$x = 10.25 - 2y$

$x = 10.25 - 2(4.25)$

$x = 10.25 - 8.50$

$x = 1.75$

$x + 2y = 10.25$

$x = 10.25 - 2y$

$x + 4y = 18.75$

$10.25 - 2y + 4y = 18.75$

$10.25 + 2y = 18.75$

$-10.25 \quad -10.25$

$2y = 8.50$

$y = 4.25$

3. You can buy CDs at a local store for $15.49 each. You can buy CDs online for $13.99 each plus $6 for shipping. Solve a system of equations to find the number of CDs you can buy for the same amount at each place.

# of CD's = x

(your) total cost = y

bought 4 CD's
& spent $61.96

$y = 15.49x$

$y = 13.99x + 6$

$y = 15.49(4)$

$15.49x = 13.99x + 6$

$-13.99x \quad -13.99x$

$1.50x = 6$

$x = 4$

Review -- Substitution Method

1. Isolate
2. Substitute
3. Plug it in
4. Check

Assignment:

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Use the elimination method to solve each system.

4) $3x + y = -9$

$-3x - 2y = 12$

Use the elimination method to solve each system.

5) $-3x + 5y = 6$
$6x - 10y = 0$

Use the elimination method to solve each system.

6) $-3x + 5y = 6$
$6x - 10y = -12$

Use the elimination method to solve each system.

7) $2x = -4y - 4$
$3x + 5y = -3$

8. With a tail wind, a helicopter traveled 300 miles in 1 hour and 40 minutes. The return trip against the same wind took 20 minutes longer. Find the wind speed and also the air speed of the helicopter.

Equivalent systems: are systems that have the same solutions.

Review -- Elimination Method

1. Rewrite system to align like terms
2. Eliminate one of the variables
3. Solve for other variable
4. Plug it back in to the original equation

Assignment:

Pgs 128-129 18-40 evens, 44-52 evens