Choose the best method and solve

1) $4x - 4y = 8$ and $-8x + y = 19$

2) $5x + 7y = 2$ and $-2x + 7y = 9$

3) $3x - 4y = -10$ and $5x + 8y = -2$

$4x - 4y = 8$

$-8x + y = 19 = y = 19 + 8x$

(-3, -5)

solve:

$4x - 4(19 + 8x) = 8$

$4x - 76 - 32x = 8$

$-28x - 76 = 8$

$-28x = 84$

$x = -3$

$y = 19 + 8(-$

$y = 19 - 2$

$y = -5$

$5x+7y=2$ $-2x+7y=9$

$2x-7y=-9$

$7x=-7$

$x=-1$

$5(-1)+7y=2$

$-5+7y=2$

$7y=7$

$y=1$

$(-1, 1)$

$$\begin{cases} 3x-4y=-10 \\ 6x-8y=-20 \end{cases} \quad \begin{cases} 5x+8y=-2 \\ 6x-8y=-20 \end{cases}$$

$$11x=-22$$

$$x=-2$$

$$3(-2)-4y=-10$$

$$-6-4y=-10$$

$$-4y=-4$$

$$y=1$$

$$(-2,1)$$

11

$a + 4b = -4$

$-a + 10b = +16$

$-6b = 12$

$b = -2$

$a + 4(-2) = -4$

$a + -8 = -4$

$a = 4$

$(4, -2)$

$$
\begin{array}{r}
-(3x - 8y = -24) \\
3x - 5y = 4.5 \\
\hline
-13y = -19.5 \\
\hline
-13 \qquad -13 \\
y = 1.5
\end{array}
$$

$$
\begin{aligned}
3x - 5(1.5) &= 45 \\
3x - 7.5 &= 45 \\
3x &= 12 \\
x &= 4
\end{aligned}
$$

$$(4, 1.5)$$

$x+y=22$

$x-y=12$

$2x=34$

$x=17$

$17-y=12$

$y=5$

$5, 17$

a c

$2a + 5c = 31.65$

$+2a + -3c = -23.75$

$\frac{2c}{2} = \frac{7.9}{2}$

$c = 3.95$

(11) $2x+5y=11$ $\cdot -2$
$4x+3y=1$

$-4x-10y=-22$
$4x+3y=1$
$-7y=-21$
$y=+3$

$2x+5(3)=11$
$2x+15=11$
$-15\ -15$
$2x=-4$
$x=-2$

$$\begin{array}{l} 8x+3y=-7 \quad \times -2 \\ 7x+2y=-3 \quad \times 3 \end{array}$$

$$\begin{array}{r} -16x-6y=14 \\ 21x+6y=-9 \\ \hline 5x=5 \\ x=1 \end{array}$$

$$\begin{aligned} 8(1)+3y&=-7 \\ 8+3y&=-7 \\ 3y&=-15 \\ y&=-5 \end{aligned}$$

$$\begin{bmatrix} -4x+2y=0 \\ 10x+3y=8 \end{bmatrix} \begin{matrix} -3 \\ 2 \end{matrix}$$

$$12x+-6y=0$$
$$20x+6y=16$$
$$32x=16$$
$$x=1/2$$

$$10(1/2)+3y=8$$
$$5+3y=8$$
$$3y=3$$
$$y=1$$

Real-World

- Highlight the important information in the problem that will help write two equations.
- Define your variables
- Write two equations
- Use one of the methods for solving systems of equations to solve.
- Check your answers by substituting your ordered pair into the original equations.
- Answer the questions in the real world problems. Always write your answer in complete sentences!

ample 1: Systems Word Problems

are running a concession stand at a basketball game. You are selling hot dogs
sodas. Each hot dog costs $1.50 and each soda costs $0.50. At the end of the
t you made a total of $78.50. You sold a total of 87 hot dogs and sodas
ıbined. You must report the number of hot dogs sold and the number of sodas
. How many hot dogs were sold and how many sodas were sold?

1. Let's start by identifying the important information:

1. Let's start by identifying the important information:
    - hot dogs cost $1.50
    - Sodas cost $0.50
    - Made a total of $78.50
    - Sold 87 hot dogs and sodas combined

2. Define your variables.

- Ask yourself, "What am I trying to solve for? What don't I know?

In this problem, I don't know how many hot dogs or sodas were sold. So this is what each variable will stand for. (Usually the question at the end will give you this information).

2. Define your variables.

- Ask yourself, "What am I trying to solve for? What don't I know?

In this problem, I don't know how many hot dogs or sodas were sold. So this is what each variable will stand for. (Usually the question at the end will give you this information).

Let x = the number of hot dogs sold

Let y = the number of sodas sold

3. Write two equations.

One equation will be related to the price and one equation will be related to the quantity (or number) of hot dogs and sodas sold.

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$1.50x + 0.50y = 78.50$ (Equation related to cost)

$x + y = 87$ (Equation related to the number sold)

4. Solve!

We can choose any method that we like to solve the system of equations. I am going to choose the substitution method since I can easily solve the 2nd equation for y.

Step 1: Rewrite $x + y = 87$

$x - x + y = 87 - x$
$y = 87 - x$
$y = -x + 87$

Step 2: Substitute this equation into the 1st equation and solve for x.

$1.50x + .50(-x + 87) = 78.50$
$1.50x + (-.50x) + 43.50 = 78.50$ Distribute!
$x + 43.50 = 78.50$ Combine like terms.
$x + 43.50 - 43.50 = 78.50 - 43.50$ Solve for x.
$x = 35$

Step 3: Now substitute your value for x (35) and solve for y.

$y = -x + 87$
$y = -35 + 87$
$y = 52$

(35, 52) is the solution to this system.

5. Think about what this solution means.

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x is the number of hot dogs and x = 35. That means that 35 hot dogs were sold.

y is the number of sodas and y = 52. That means that 52 sodas were sold.

6. Write your answer in a complete sentence.

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35 hot dogs were sold and 52 sodas were sold.

7. Check your work by substituting.

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$1.50x + 0.50y = 78.50$

$1.50(35) + 0.50(52) = 78.50$

$52.50 + 26 = 78.50$

AND

$x + y = 87$

$35 + 52 = 87$

Since both equations check properly, we know that our answers are correct!

YOUR TURN... s = soft b = burritos

and a friend go to Tacos Galore for lunch. You order three soft tacos and three os and your bill totals $11.25. Your friend's bill is $10.00 for four soft tacos and two os. How much do soft tacos cost? How much do burritos cost?

$3s+3b=11.25$ $4s+2b=10$

$-2(6s+6b=22.5)$ $-12s+-6b=-30$

Solve $6s+6b=22.5$

$-12s+-6b=-30$

$-6s=-7.5$

$s=1.25$

$3(1.25)+3b=11.$

$3.75+3b=11.$

$3b=7.5$

$b=2.5$

1. Let's start by identifying the important information:

   - 3 soft tacos + 3 burritos cost $11.25
   - 4 soft tacos + 2 burritos cost $10.00

2. Define your variables.

- Ask yourself, "What am I trying to solve for? What don't I know?

In this problem, I don't know the price of the soft tacos or the price of the burritos.

Let x = the price of 1 soft taco

Let y = the price of 1soda

3. Write two equations.

One equation will be related your lunch and one equation will be related to your friend's lunch.

$3x + 3y = 11.25$ (Equation representing your lunch)

$4x + 2y = 10$ (Equation representing your friend's lunch)

4. Solve!

We can choose any method that we like to solve the system of equations. I am going to choose the combinations method.

Step 1: Rewrite each equation in order to have opposite terms!

$2\,[3x + 3y = 11.25] \quad = \quad 6x + 6y = 22.50$
$-3\,[4x + 2y = 10] \quad = \quad -12x - 6y = -30$

$$\begin{array}{r} 6x + 6y = 22.50 \\ -12x - 6y = -30 \\ \hline \end{array}$$

$$\frac{-6x}{-6} = \frac{-7.50}{-6}$$

$x = 1.25$

Step 2: Now substitute the value for x (1.25) back into one of the equations and solve for y.

$4x + 2y = 10$	
$4(1.25) + 2y = 10$	Substitute.
$5 + 2y = 10$	Simplify.
$5 - 5 + 2y = 10 - 5$	Subtract 5 from both sides.
$\frac{2y}{2} = \frac{5}{2}$	Divide by 2.

$y = 2.5$

(1.25, 2.5) is the solution to this system of equations.

Step 3: Check:

$3x + 3y = 11.25$	$4x + 2y = 10$
$3(1.25) + 3(2.5) = 11.25$	$4(1.25) + 2(2.5) = 10$
$3.75 + 7.5 = 11.25$ ☺	$5 + 5 = 10$ ☺

5. Think about what the solution means in context of the problem.

x = the price of 1 soft taco and x = 1.25.

That means that 1 soft tacos costs $1.25.

y = the price of 1 burrito and y = 2.5.

That means that 1 burrito costs $2.50.