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CRMA 0372
College Readiness Algebra II
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* $81^{x-2} = 3^{8x}$

$(3^4)^{x-2} = 3^{8x}$

$3^{4x-8} = 3^{8x}$

$4x - 8 = 8x$

$4x = -8$

$x = -2$

* $4^{x+7} = 11$

$\log 4^{x+7} = \log 11$

$(x+7)\log 4 = \log 11$

$x \log 4 + 7 \log 4 = \log 11$

$x \log 4 = \log 11 - 7 \log 4$

$x = \dfrac{\log 11 - 7 \log 4}{\log 4}$

* $e^{x-8} = 5$

$\ln e^{x-8} = \ln 5$

$(x-8)\ln e = \ln 5$

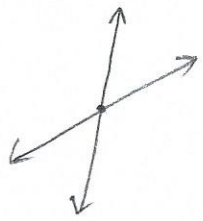
$(x-8)(1) = \ln 5$, $\ln e = 1$

$x - 8 = \ln 5$

$x = 8 + \ln 5$

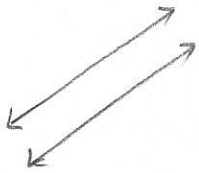
Solving a system of equations with two variables.

Case 1:



This case has one solution

Case 2:



The two lines are parallel and never cross. There is no solution because they never cross.

Case 3:

The two lines could be the same line. There would be an infinite number of solutions that would consist of all ordered pairs (x,y) that are on the line.

① $-5x + 4y = 2$

② $3x - 5y = 4$

is $(-2,-2)$ a solution to this system

① $-5(-2) + 4(-2) = 2$

$10 - 8 = 2$

$2 = 2$

② $3(-2) - 5(-2) = 4$

$-6 + 10 = 4$

$4 = 4$

True

Is (3,1) a solution to the system?

① $-5(3)+4(1)=2$

$-15+4=2$

$-11=2$

NO

Is (4,1) a solution to the system?

① $2x+3y=11$

② $3x-2y=9$

① $2(4)+3(1)=11$

$8+3=11$

$11=11$

② $3(4)-2(1)=9$

$12-2=9$

$10=9$

NO

Solving by substitution:

① $5x-2y=4$

② $x=y-1$

1) Solve one equation for one of the variables.

2) Substitute that expression in the other equation for the variable you solved for.

$5(y-1)-2y=4$

$5y-5-2y=4$

$3y=4+5$

$3y=9$

$y=3$

Now plug in $y=3$ to find x

$$x = 3 - 1$$
$$x = 2$$

Check:

$$5(2) - 2(3) = 4$$
$$10 - 6 = 4$$
$$4 = 4$$

$$(x, y) = \{(2, 3)\}$$

Solve by substition.

① $3x - 2y = -1$

② $x = \frac{3}{4}y$

$$3\left(\frac{3}{4}y\right) - 2y = -1$$

$$\frac{9}{4}y - 2y = -1$$

$$(4)\ \frac{9}{4}y - 2y(4) = -1(4)$$

$$9y - 8y = -4$$
$$y = -4$$

$$x = \frac{3}{4}(-4)$$
$$= -3$$

Check:

$$3(-3) - 2(-4) = -1$$
$$-9 + 8 = -1$$
$$-1 = -1 \quad \checkmark$$

Solving by elimination:

$4x + 5y = 11$ ← multiply by 3

$3x - 2y = -9$ ← multiply by -4

$$12x + 15y = 33$$
$$-12x + 8y = 36$$
$$23y = 69$$
$$y = 3$$

1) Put both equations in form $Ax + By = C$
2) Make one pair of variable terms opposite
3) Add the two equations together to eliminate either x-terms or y-terms
4) Solve the new equation that

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

$3x - 6 = -9$

$3x = -9 + 6$

$3x = -3$

$x = -1$

$(x, y) = (-1, 3)$

5) go back and find the other variable

6) check

Special cases:

if both x and y terms are eliminated when you are solving a system and -

1) you get a true statement. Ex. $0 = 0$

you have an infinite number of solutions that consist of all ordered pair on the line.

2) you get a false statement. Ex. $2 = 0$

you have no solution because the lines are parallel.

① $12x + 9y = 36$

② $4x + 3y = 12$ ← multiply by -3

① $12x + 9y = 36$

$-12x - 9y = -36$

$0 = 0$

true

These are the same line.

you have an infinite # of solutions.

$\{(x, y) \mid 4x + 3y = 12\}$

① $-3x + 2y = 5$

② $-6x + 4y = 12$

① $6x - 9y = -10$

② $-6x + 9y = 12$

$0 = 2$

false. $\emptyset$.