Math 1010 9/12/2012 - Sec 4.1

~~#36~~
~~#21~~
~~#66~~
~~#24~~
~~#6~~

#6 $g(10)$

$g(x) = -x^2 + 4x + 1$

$g(10) = -(10)^2 + 4(10) + 1$

#21 $f(x) = -3x + 4$: $f(4) = -3(4) + 4$

$= -12 + 4 = -8$

$g(x) = -x^2 + 4x + 1$: $g(4) = -(4)^2 + 4(4) + 1$

$= -16 + 16 + 1$

$= 1$

$f(4) - g(4)$

$(-8) - (1)$

$-8 - 1 = -9$

or:

$[-3(4) + 4] - [-(4)^2 + 4(4) + 1]$

#24 $f = \{(-1, -5), (0, 5), (2, -5)\}$

a) $f(2) = -5$

b) $f(-1) = -5$

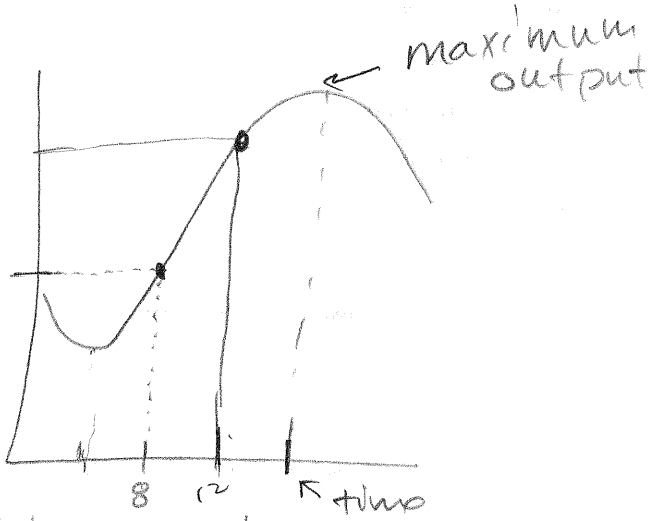
#36

a) $f(x) = 4$ (4 is the y value), what is the x value

$x = 3$

#66

a) passes the vertical line test



b) Domain: possible x values

$[0, 24]$

c)

Sec 4.1 Systems of Linear Equations in two Variables

System of Linear Equations: A set of Linear Eq

Ex: $\begin{cases} x+y=6 \\ 4x-y=14 \end{cases}$

Solution is any point that satisfies <u>all</u> two equations in the system

(4,2) is a solution to our system

check:

$x+y=6$

$4+2=6$

$6=6$ ✓

$4x-y=14$

$4(4)-2=14$

$16-2=14$

$14=14$ ✓

yes (4,2) is a solution to the system.

Is (2,4) a solution

$x+y=6$

$2+4=6$

$6=6$ ✓

$4x-y=14$

$4(2)-4=14$

$8-4=14$

$4 \neq 14$ false!

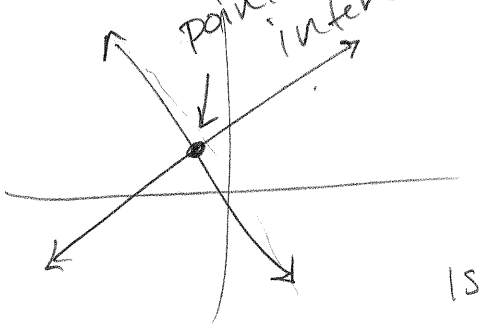
(2,4): Not a solution

3 Methods for Solving

1. Graphing
2. Substitution
3. Elimination

Solving by Graphing

point of intersection = Solution



Ex: $2x+y=-5 \Rightarrow y=-2x-5$

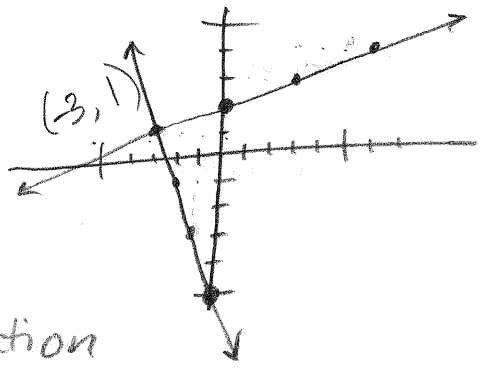
$-x+3y=6 \Rightarrow y=\frac{1}{3}x+2$

$3y=x+6$

1st: Graph both equation

2nd: Determine the point intersection

3rd: Check the Solution

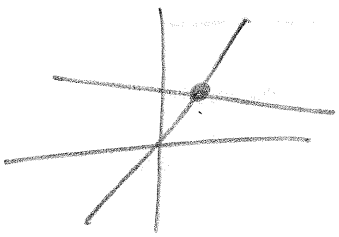


$$\begin{cases} 2x+y=-5 \\ 2(-3)+1=-5 \\ -6+1 \\ -5=-5 \checkmark \end{cases} \qquad \begin{cases} -x+3y=6 \\ -(-3)+3(1)=6 \\ 3+3=6 \\ 6=6 \checkmark \end{cases}$$

Solution: $(-3, 1)$

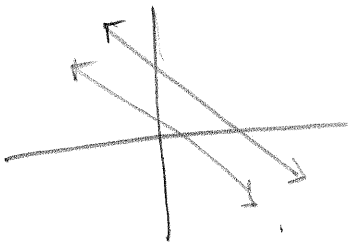
Possible solution types

Case 1 two graphs intersect at a single point



- this gives us only one solution
- system is called consistent
- the equations are independent

Case 2 the graphs are parallel

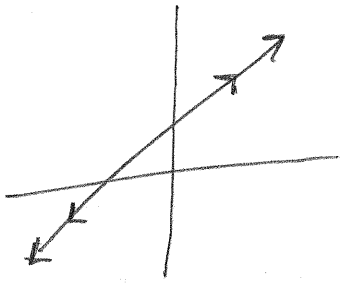


- no point in common, so no solution
- our solution set is empty

  shown: $\varnothing$, $\{\ \}$

- system is called inconsistent
- equations are independent

Case 3 the graphs are the same line



- Every point on the line is a solution
- Solution set is every ordered pair on the line, infinitely solutions

$$\{(x,y) \mid Ax+By=C\}$$

(Equation of the Line)

- system is consistent
- the equations are dependent

Solving by Substitution

1st Solve one of the equations for one of the variables

2nd Substitute that variable into the other equation

3rd Solve the Resulting equation for the other variable

4th use Result to solve for the other variable

5th Check the solution

Ex: $3x+2y=13$

$4x-y=-1$ ← for y

$\frac{-y}{-1}=\frac{-4x}{-1}-\frac{1}{-1}$

$y=4x+1$

$3x+2(4x+1)=13$

$3x+8x+2=13$

$-2 \quad -2$

$\frac{11x}{11}=\frac{11}{11}$; $x=1$

$y=4(1)+1=4+1=5$

$(1,5)$

Solving by elimination

1st write both equations in standard form ($Ax + By = C$)

2nd Choose one variable to eliminate, Multiply two equations by appropriate Numbers so that the coefficients add to 0

3rd Add the two two equations together to eliminate the Chosen Variable

4th Solve the Result

5th Use the Result to solve for the other variable

6th Check Solution

Ex: $5x - 2y = 4$ * 3

$2x + 3y = 13$ * 2

$15x - 6y = 12$

$4x + 6y = 26$

$19x = 38$

$\frac{19x}{19} = \frac{38}{19}$

$x = 2$