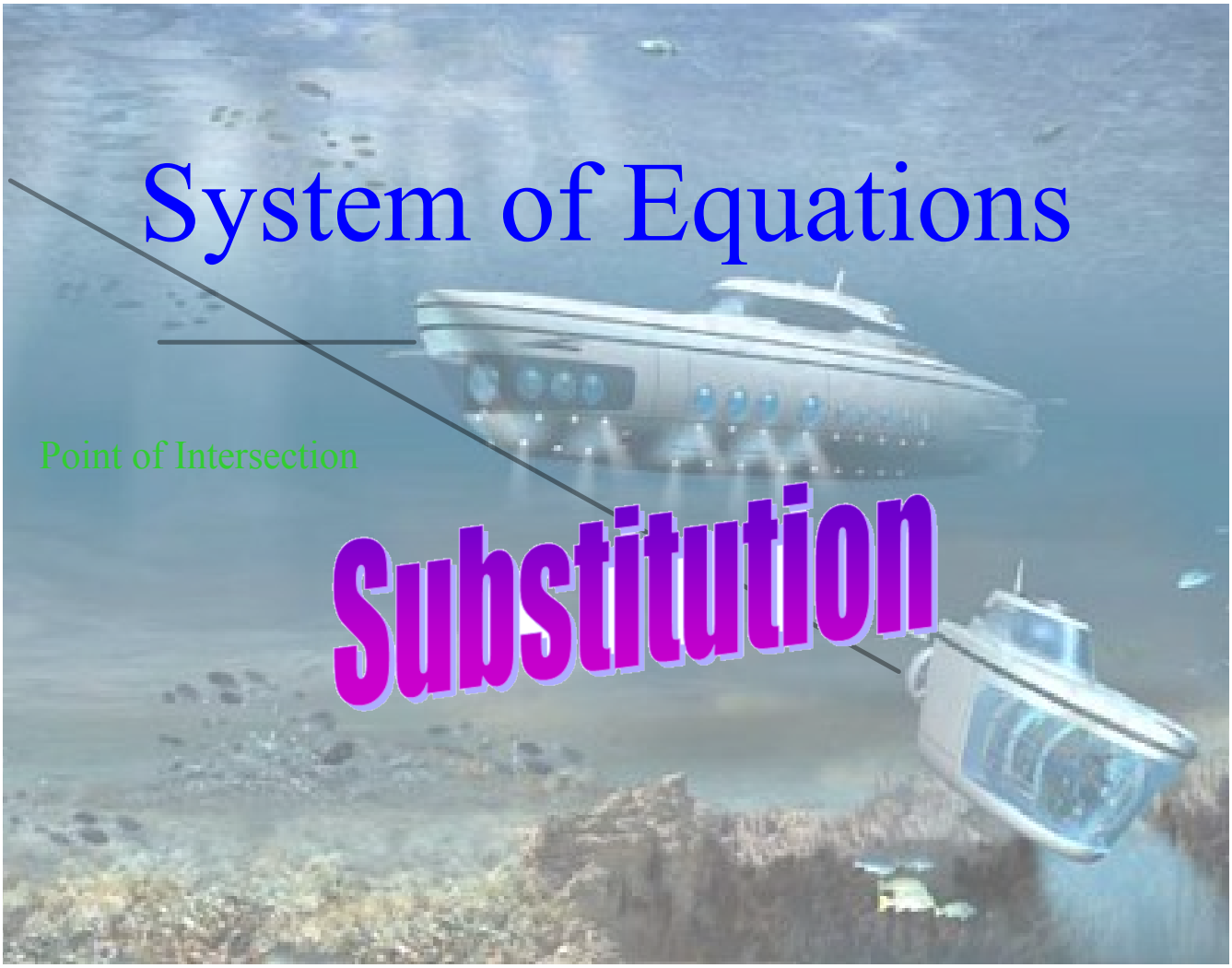
System of Equations
Point of Intersection
Substitution

Substitution Method

Steps:

i) Choose one equation and isolate one variable;
this equation will be considered the first equation.
(easiest one to get x= or y= from either eqn 1 or eqn 2)

ii) Substitute the solution from step 1 into the second equation and solve for the variable in the equation.

iii) Using the value found in step 2, substitute it into the first equation and solve for the second variable.

iv) Substitute the values for both variables into both equations to show they are correct.

Substitution

You need to isolate x or y

$y = 3+3x$ (1)

$+3x - 8y = -3$ (2)

$(-1, 0)$

$3x - 8(3+3x) = -3$

$3x - 24 - 24x = -3 + 24$

$\frac{-21x}{-21} = \frac{21}{-21}$

$x = -1$

$y = 3+3(-1)$

$y = 3 - 3$

$y = 0$

Solve this system of equation by substitution.

$y = 15+6x$ (1)

$-3x -2y=0$ (2)

$-3x -2(15+6x) =0$

$-3x -30 -12x =0$

$-15x = +30$

$\frac{-15x}{-15} = \frac{+30}{-15}$

$x = -2$

$y = 15+6(-2)$

$y = 15 -12$

$y = 3$

$(-2,3)$

$-3x -2y = 0$

$-3x -2(15+6x) = 0$

$-3x -30 -12x = 0$

$-3x -12x = 0 +30$

$-15x = 30$

$x = -2$

$y = 15+6x$

$y = 15 + 6(-2)$

$y = 15 - 12$

$y = 3$

(-2,3)

Substitution

$y = 2x + 2$ ①

$y = 6x + 14$ ②

$y = 6x + 14$

$2x + 2 = 6x + 14$

$2x - 6x = 14 - 2$

$\frac{-4x}{-4} = \frac{12}{-4}$

$x = -3$

$y = 2(-3) + 2$

$y = -6 + 2$

$y = -4$

$(-3, -4)$

What if??

$8x-2y=-2$ ①

$-4x+3y=11$ ②

Rearrange ①

$8x-2y=-2$

$-2y=-2-8x$

$\frac{-2y}{-2}=\frac{-2}{-2}-\frac{8x}{-2}$

$y=1+4x$ ①

$-4x+3(1+4x)=11$

$-4x+3+12x=11-3$

$-4x+12x=8$

$\frac{8x}{8}=\frac{8}{8}$

$x=1$

$y=1+4(1)$

$y=5$

$(1,5)$

Solve the system by Substitution Method

$x + 2y = 3$

$3x + 5y = 8$

solve for x → $x = 3 - 2y$

$3x + 5y = 8$

$3(3-2y) + 5y = 8$

$9 - 6y + 5y = 8$

$-6y + 5y = 8 - 9$

$y = 1 \qquad -y = -1$

$x + 2y = 3$

$x + 2(1) = 3$

$x + 2 = 3$

$x = 3-2$

$x = 1$

(1,1)

Use Substitution to Find the Point of Intersection

1) $x - 4y = 6$ ①

$7x + 6y = 8$ ②

Rearrange ①

$x - 4y = 6$

$x = 6 + 4y$

$7(6+4y) + 6y = 8$

$42 + 28y + 6y = 8 - 42$

$\frac{34y}{34} = \frac{-34}{34}$

$y = -1$

$x = 6 + 4(-1)$

$x = 6 - 4$

$x = 2$

$(2, -1)$