8.4 Solving Systems by Substitution: Parallel & Coincidental Lines

Math 10

Solving Systems of Linear Equations Algebraically
Substitution Method – Parallel and Coincidental Lines

It is easy to identify parallel and coincidental lines on graphs, but how can we identify them using the substitution method? We will look at an example of each type to answer this question.

Solve each system of linear equations by substitution.

a) ① $8x - 2y = 10$
② $-4x + y = 12$

② $y = 4x + 12$

① $8x - 2(4x+12) = 10$

$8x - 8x - 24 = 10$

$-24 = 10$

never true!

∴ no solution

∴ parallel lines

b) ① $x + 6y = -7$
② $3x = -18y - 21$

① $x = -6y - 7$

② $3(-6y-7) = -18y - 21$

$-18y - 21 = -18y - 21$

same!

always true

∴ infinitely many solutions

∴ coincidental lines

The solution to a system of linear equations which is always true indicates the lines are coincidental.

The solution to a system of linear equations which is never true indicates the lines are parallel.

Assignment: handout

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