Assigned Work: p. 59 # 1, 2a, 3abcfh, 4, 6*

Distinct or Coincident Lines (1.7)

Remember the linear systems that we solved by graphing in our first lesson?

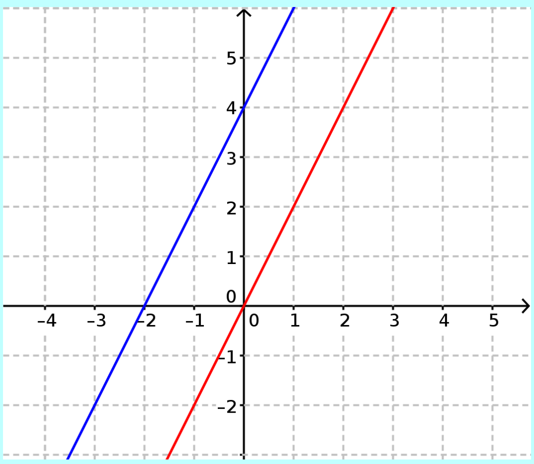
a) $y = 2x + 4$
$y = 2x$

b) $y = 2x + 4$
$y = -x + 4$

c) $y = x - 3$
$4x - 4y = 12$

Feb 14 - 3:29 PM

a) $y = 2x + 4$
$y = 2x$



These lines are parallel and distinct. There is no solution to the system.

What would happen when you tried solve this system algebraically?

Feb 11-7:36 AM

Assigned Work: p. 59 # 1, 2a, 3abcfh, 4, 6*

Distinct or Coincident Lines (1.7)

Feb 17/2016

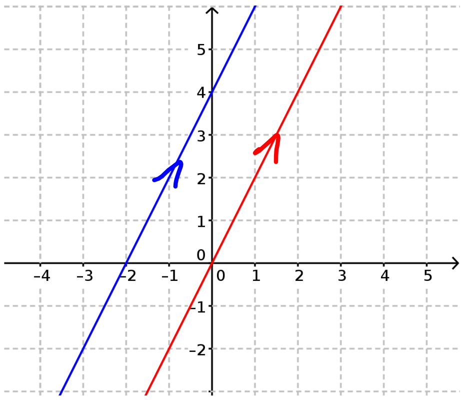
Solve the following linear system using an algebraic method.

$$y = 2x + 4 \quad (1)$$
$$y = 2x \quad (2)$$

$(1)-(2)$ $\quad 0 = 4$

$\underbrace{\qquad\qquad}_{\text{not possible}}$

$\therefore$ no solution



never cross

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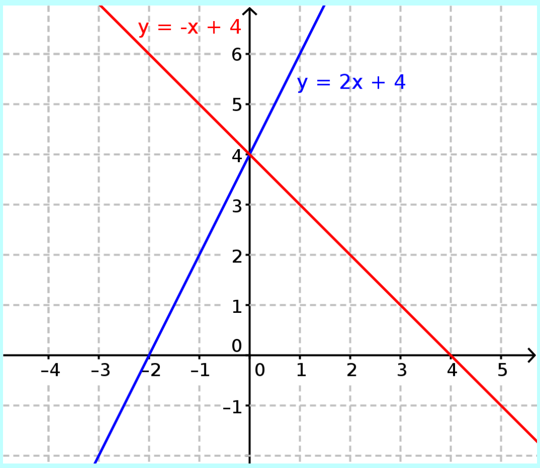
b) $y = 2x + 4$
$y = -x + 4$



These lines are not parallel. There is **one** solution to the system.

What would happen when you solve this system algebraically?

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Solve the following linear system using an algebraic method.

$y = 2x + 4$
$y = -x + 4$

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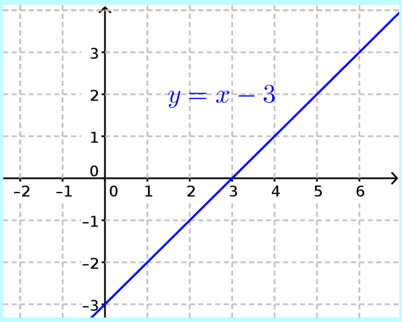
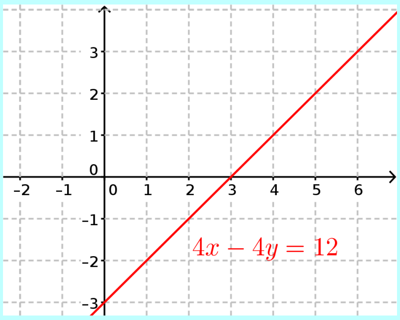
c) $y = x - 3$
$4x - 4y = 12$



These lines are the same (<u>coincident</u>).

There are **infinitely many** solutions to the system.



What would happen when you try to solve this system algebraically?

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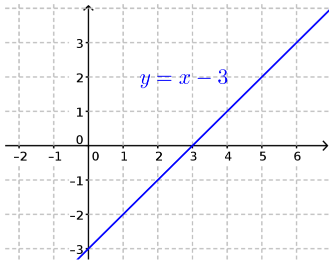
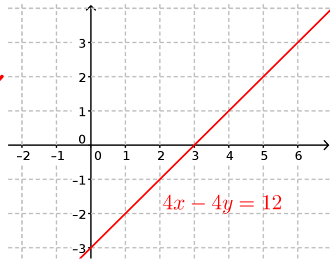
Solve the following linear system using an algebraic method.

$y = x - 3$ ①
$4x - 4y = 12$ ②





sub ① into ②

$4x - 4(x-3) = 12$

$4x - 4x + 12 = 12$

$12 = 12$ ✓

$-12 \quad -12$

$0 = 0$ ✓

always true

∴ infinite solutions

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When solving a linear system algebraically:

<u>Exactly One Solution (different slopes)</u>
- you can find the value of one of the variables and then solve for the other.

<u>No Solution (parallel lines)</u>
- you end up with an untrue statement. e.g. 0x = 2 is <u>never</u> true
- these lines are distinct.

<u>Infinitely Many Solutions (same lines)</u>
- you end up with a statement which is true for any value of x.
- 0x = 0 is <u>always</u> true
- these lines are coincident.

Assigned Work: p. 59 # 1, 2a, 3abcfh, 4, 6*

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Ex.1 Write a linear system with:

a) infinitely many solutions

b) no solution

State why it satisfies the condition and then solve the system.

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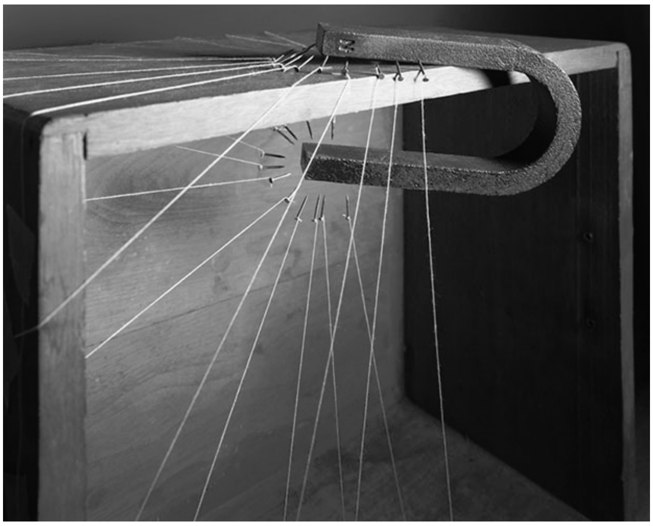
bfh



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2(a) $3x + 4y = 2$

(i) no solution slope same (parallel)
diff y-int

$y = mx + b$

$3x + 4y = 2$
$4y = -3x + 2$
$y = -\frac{3}{4}x + \frac{1}{2}$
✓ ×

$y = -\frac{3}{4}x + 5$

(ii) one solution diff. slopes

$y = -6x + 1$
OR
$y = 21x$
OR
$y = \frac{6}{7}x - 40$

(iii) infinite solutions (same slope
same y-int
OR
same line)

$3x + 4y = 2$
$6x + 8y = 4$) $\times 2$

rearrange OR
$3x = -4y + 2$

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3(b) $y = 4x - 3$ ①
$y = 4x - 7$ ②

distinct
no solution

①-② $0 = 0 + 4$
$0 = 4$

$-3 - (-7)$
$= -3 + 7$
$= 4$

(f) $3x - 5y - 2 = 0$ ①
$4x + 5y + 2 = 0$ ②

1 solution

①+② $\frac{7x}{7} = \frac{0}{7}$
$x = 0$

3(h) $2x - 5 = 4y$
$0.01x - 0.02y = 0.25$

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6. $\underbrace{3x-5y}=\underline{20}$

$18x=30y+72$

$18x-30y=72$

$9x-15y=36$

$\underbrace{3x-5y}=\underline{12}$

diff. y-int

same slope

"since"

$\because$ parallel but distinct

$\therefore$ no change necessary

"therefore"

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