L2(1.4)Solving Linear Systems by Substitution

Given y = 2x + 3, what does it mean if:

Feb 8/2011

(a) x = -1 (b) y = 7 (c) y = x - 1

solve graphically

Given y = 2x + 3, what does it mean if:

(a) x = -1

$y = 2(-1) + 3$

$= -2 + 3$

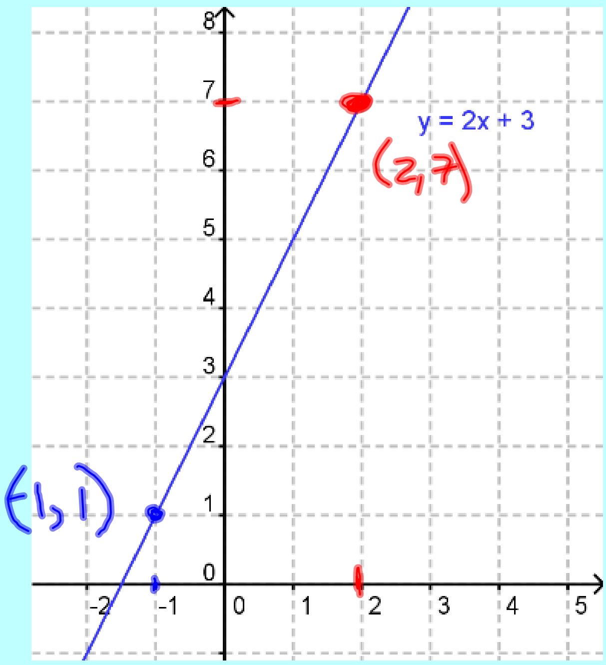
$= 1$

(b) y = 7

$7 = 2x + 3$

$\frac{4}{2} = \frac{2x}{2}$

$x = 2$



solve graphically

Given y = 2x + 3, what does it mean if:

(c) x = y + 1

$y = 2(y+1)+3$

$y = 2y + 2 + 3$

$y = 2y + 5$

$-2y \quad -2y$

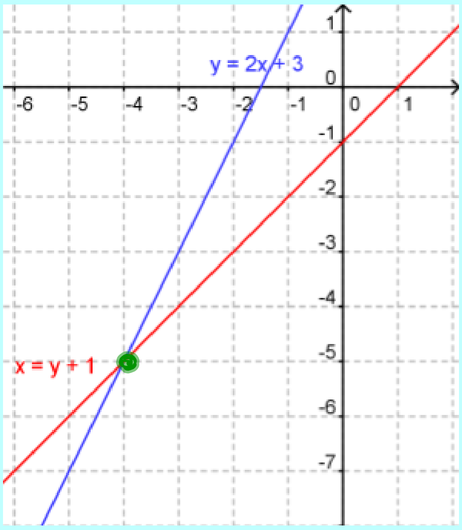
$-y = 5$

$y = -5$ → sub into

$x = y + 1$

$x = -5 + 1$

$x = -4$



solve graphically

Solving Linear Systems by Substitution

Graphically, the solution to a system of linear equations is the point(s) where the lines intersect.

Algebraically, we can:

1. isolate one variable in one equation.

   $x =$ ___ or $y =$ ___

2. substitute the isolated variable into the other equation.

3. solve for the single variable.

4. sub the answer from step 3 into the isolated equation from step 1 to find the other variable.

Feb 10-8:48 PM

Ex.1. Solve y = 3x - 2 and x = y - 2.
① ②

Sub the x-value from the second equation into the first equation

$\underbrace{\text{Sub ① into ②}}_{\text{a little easier}}$ or ② into ①

②: $x = y - 2$

Sub①: $x = (3x - 2) - 2$

$x = 3x - 2 - 2$

$x = 3x - 4$

$-3x \quad -3x$

$-2x = -4$

$\boxed{x = 2}$ → Sub $x = 2$ into ①

$y = 3x - 2$

$y = 3(2) - 2$

$y = 6 - 2$

$\boxed{y = 4}$

∴ the solution is (2, 4)

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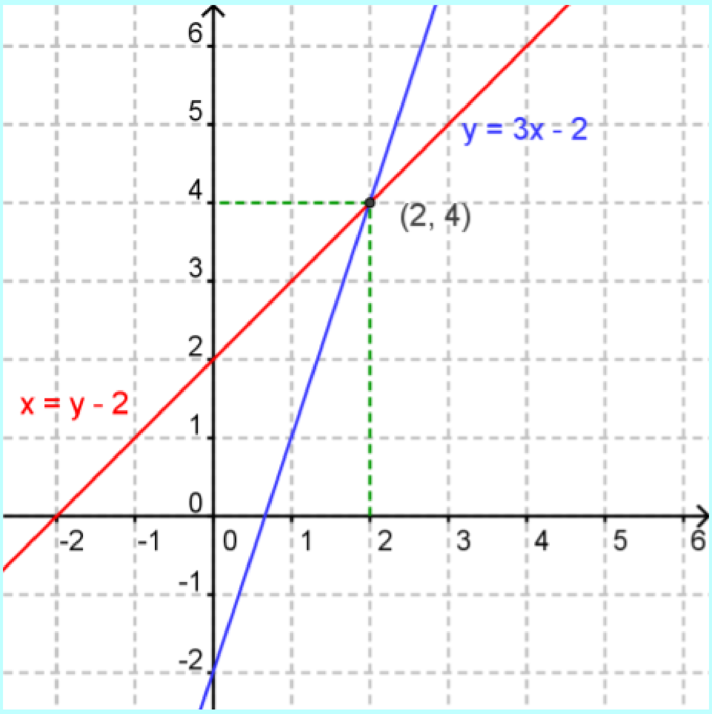
Ex.1. Solve y = 3x - 2 and x = y - 2.



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Ex.1. Solve y = 3x - 2 and x = y - 2.

The solution is (2, 4), or x = 2 and y = 4.

To perform a formal check of the solution, sub these values into each equation and compare sides.

y = 3x - 2	x = y - 2
$LS = y$ $= 4$ $RS = 3x - 2$ $= 3(2) - 2$ $= 6 - 2$ $= 4$ $LS = RS$ ✓	$LS = x$ $= 2$ $RS = y - 2$ $= 4 - 2$ $= 2$ $LS = RS$ ✓

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Ex.2. Solve 2y = x + 5 and x - 4y = 0.
① ②

How do we decide which variable to isolate first?

①: $2y = x + 5$

$2y - 5 = x$ ③

Sub ③ into ②

$x - 4y = 0$

$(2y - 5) - 4y = 0$

$2y - 5 - 4y = 0$

$-2y - 5 = 0$

$\frac{-5}{2} = \frac{2y}{2}$

$\boxed{y = -\frac{5}{2}}$

Sub $y = -\frac{5}{2}$ into ③

$x = 2y - 5$

$x = 2\left(-\frac{5}{2}\right) - 5$

$x = \frac{-10}{2} - 5$

$x = -5 - 5$

$\boxed{x = -10}$

∴ the solution is $\left(-10, -\frac{5}{2}\right)$

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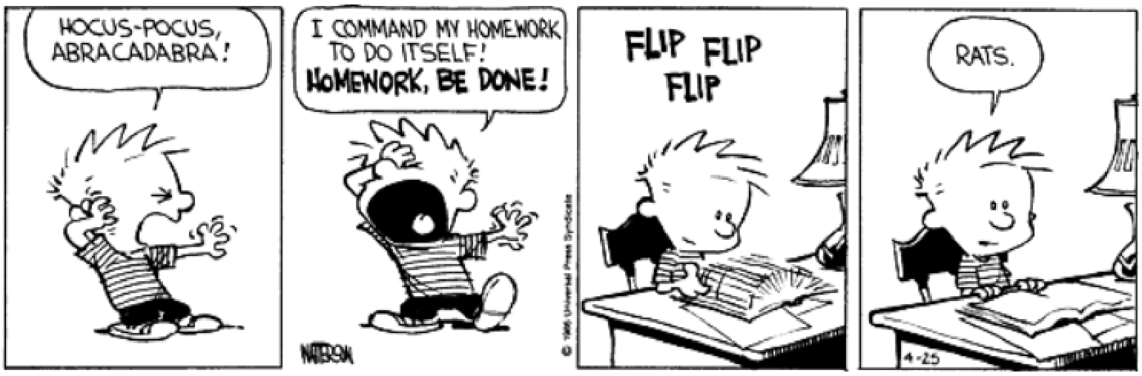
Assigned Work:

p. 39-40 # 3, 4bf, 5be, 6, 8, 9bcef



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4(b) $6r + 3s = 9$, solve for r

$$\frac{6r}{6} = \frac{-3s}{6} + \frac{9}{6}$$

$$r = -\frac{\cancel{3}^{1}s}{\cancel{6}_{2}} + \frac{\cancel{9}^{3}}{\cancel{6}_{2}} \quad \checkmark \text{ c}$$

$$\boxed{r = -\frac{1}{2}s + \frac{3}{2}}$$

slope intercept

Feb 9-1:02 PM

5(a) $2x+y=5$ ① $x-3y=13$ ②

①: $2x+y=5$

$y=-2x+5$ ③

sub ③ into ②

$x-3(-2x+5)=13$

$x+6x-15=13$

$\quad +15 \quad +15$

$\frac{7x}{7}=\frac{28}{7}$

$\boxed{x=4}$

sub $x=4$ into ③

$y=-2x+5$

$y=-2(4)+5$

$y=-8+5$

$\boxed{y=-3}$

$\therefore$ the solution is $(4,-3)$

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5(b) $x=y+4$ ① $3x+y=16$ ②

already isolated!

sub ① into ②

$3x+y=16$

$3(y+4)+y=16$

$3y+12+y=16$

$4y=4$

$\boxed{y=1}$

sub $y=1$ into ①

$x=y+4$

$x=(1)+4$

$\boxed{x=5}$

$\therefore$ solution is $(5,1)$

Feb 9-1:15 PM

4 months → 420

9 months → 795

fixed charge

Let x be the monthly charge

Let y be the fixed charge

Feb 9-1:24 PM

Attachments

Basic 2D Grid.agg