

## Solving Systems by Substitution

We learned that a solution to a system is where the lines/graphs cross

But graphing is not accurate enough (we had to guess on the accuracy of the point)

Algebraic methods are better as they will produce exact answers.

The key will be to have a **y = or x = equation**

1) Solve the following

a)  $y = 2x - 5$   
 $4x + y = 13$

To solve the system – those y's must be the same. The y in  $4x + y = 13$  must be  $2x - 5$

So substitute it:  $4x + (2x - 5) = 13 \rightarrow 6x - 5 = 13 \rightarrow 6x = 18$  thus  $x = 3$

And  $y = 2(3) - 5$  so  $y = 1$  as a point  $(3, 1)$  solves this system

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b)  $x = 9y + 1$   
 $5x - 3y = 19$

Here we know x ... sub in

$5(9y + 1) - 3y = 19 \rightarrow 45y + 5 - 3y = 19 \quad 42y = 14 \quad y = \frac{1}{3}$  and  $x = 9(\frac{1}{3}) + 1 \quad x = 4$

as a point  $(4, \frac{1}{3})$  solves this system

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c)  $6x - y = 7$   
 $3x - 7y = 10$

We don't have a y = but we can make one ...  $6x - 7 = y$

$3x - 7(6x - 7) = 10 \rightarrow 3x - 42x + 49 = 10 \quad -39x = -39 \quad x = 1$   
 $y = 6(1) - 7 \quad y = -1$

as a point  $(1, -1)$  solves this system

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Not all answers are nice and neat ...

d)  $5x - 3y = 10$   
 $x - 7y = 11$

$x = 11 + 7y \quad 5(11 + 7y) - 3y = 10 \rightarrow 55 + 35y - 3y = 10 \quad 32y = -45$

$y = \frac{-45}{32} \quad x = 11 + 7(\frac{-45}{32}) \quad \text{use your fraction button } x = \frac{37}{32} \quad (\frac{37}{32}, \frac{-45}{32})$

Assignment = worksheet

Why did the ghost decide to haunt city hall?

(Solve with sub sheet)

1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12
										B	E									M	A	R	E

1  $y = 2x$   
 $x + y = 12$

2  $x = 3y - 1$   
 $x + 2y = 9$

3  $y = 2x - 5$   
 $4x - y = 7$

4  $2x - 3y = 12$   
 $x = 4y + 1$

5  $y = -x + 5$   
 $x - 4y = 10$

7  $-2x + 3y = 14$   
 $x + 2y = 7$

8  $6x + 4 = y$   
 $2x + 2y = 15$

9  $x + y = 1$   
 $2x - y = -2$

10  $5x - 3y = -11$   
 $x = 2 + 2y$

**ANSWERS**

$(\frac{1}{2}, -3)$	ER
$(8, -\frac{1}{2})$	TE
$(-\frac{1}{3}, \frac{4}{3})$	IG
<del><math>(8, 0)</math></del>	<del>RE</del>
$(-3, 4)$	ST
$(\frac{1}{2}, 7)$	EN
$(\frac{5}{2}, \frac{4}{3})$	EX
$(-1, 4)$	TH
<del><math>(\frac{5}{2}, -\frac{1}{2})</math></del>	<del>MA</del>
$(-4, -3)$	HT

$(\frac{1}{2}, -3)$	ER
$(8, -\frac{1}{2})$	TE
$(-\frac{1}{3}, \frac{4}{3})$	IG
<del><math>(8, 0)</math></del>	<del>RE</del>
$(-3, 4)$	ST
$(\frac{1}{2}, 7)$	EN
$(\frac{5}{2}, \frac{4}{3})$	EX
$(-1, 4)$	TH
<del><math>(\frac{5}{2}, -\frac{1}{2})</math></del>	<del>MA</del>
$(-4, -3)$	HT

Now complete Page 425 #4, 5