§5.1 #s 9, 10, 23, 24, 37, 39, 45, 57, 53

2x2 Systems.

Addition

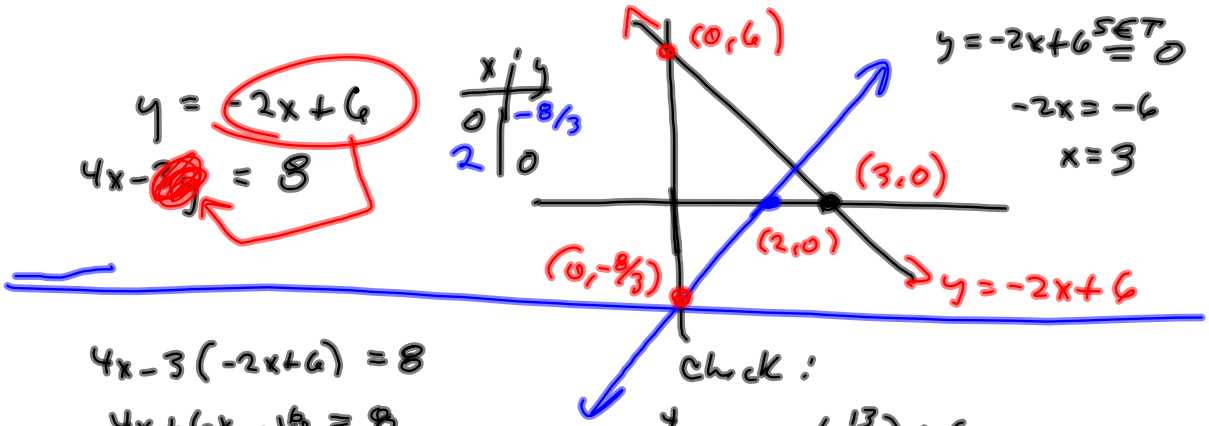
Substitution is all you need,

unless you go on to linear algebra.

$y = -2x + 6$

$4x - 3y = 8$

x	y
0	$-8/3$
2	0



$y = -2x + 6 \overset{SET}{=} 0$

$-2x = -6$

$x = 3$

$4x - 3(-2x+6) = 8$

$4x + 6x - 18 = 8$

$10x = 26$

$x = \frac{26}{10} = \boxed{\frac{13}{5} = x}$

$y = -2\left(\frac{13}{5}\right) + 6$

$= \frac{-26}{5} + \frac{30}{5}$

$= \boxed{\frac{4}{5} = y}$

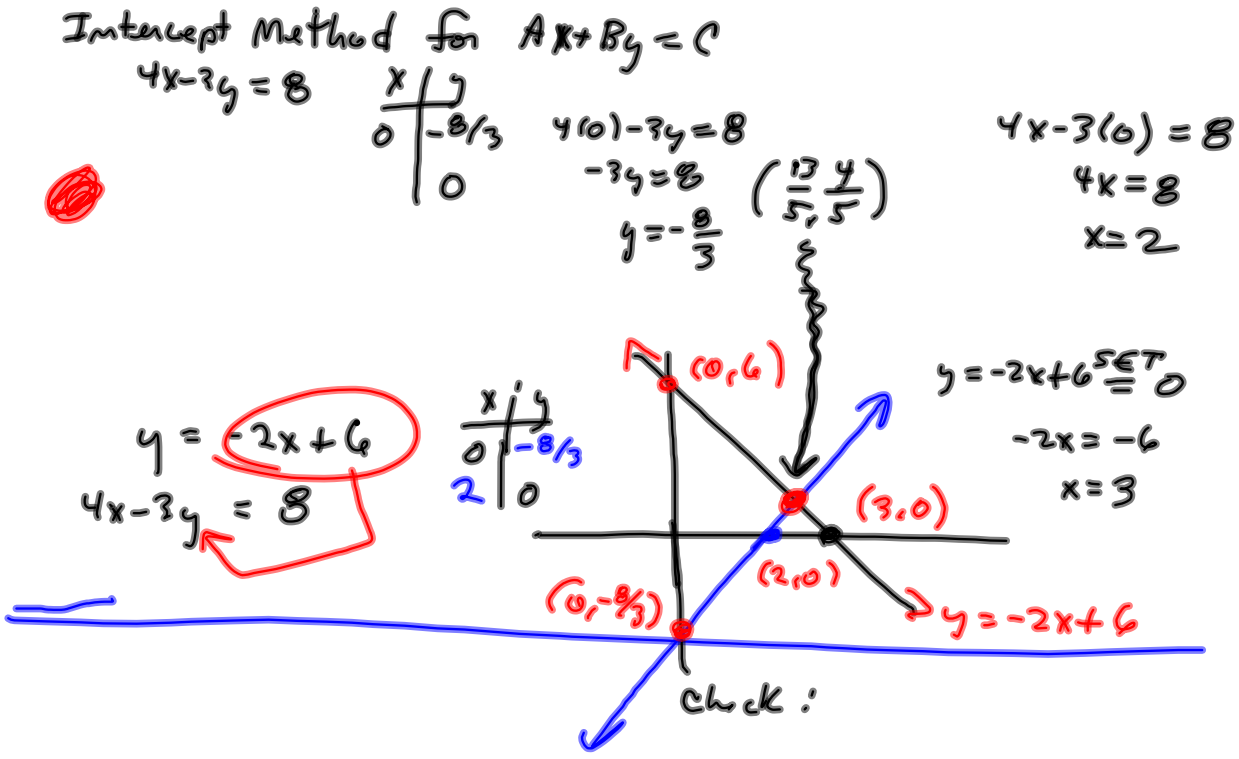
Check:

$\frac{4}{5} = -2\left(\frac{13}{5}\right) + 6$

$\frac{4}{5} = \frac{-26}{5} + \frac{30}{5}$ ✓

$4\left(\frac{13}{5}\right) - 3\left(\frac{4}{5}\right)$

$= \frac{52}{5} - \frac{12}{5} = \frac{40}{5} = 8$ ✓


Intercept Method for Ax+By=C
4x-3y=8
x | y
0 | -8/3
y | 0
4(0)-3y=8
-3y=8
y=-8/3
(13/5, 4/5)
4x-3(0)=8
4x=8
x=2
y=-2x+6 SET =0
-2x=-6
x=3
(0,6)
(3,0)
(2,0)
(0,-8/3)
y=-2x+6
y=-2x+6
4x-3y=8
x | y
0 | -8/3
2 | 0
Check:

① $2(x-3)^2+4$ ① $=0, >0, <0$ ③ $-(x-3)^2+4$ $=0, >0, <0$

② $2(x-4)^2-5$ ② $=0, \geq, \leq 0$ ④ $-(x-3)^2-4$ $=0, \geq 0, \leq 0$

⑤ $2(x+4)^2+2$ $2(x+4)^2-2$ $>0, =0, <0$ ⑥ $-2(x+4)^2+2$ $-2(x+3)^2-7$ $=0 \leq 0 \geq 0$

$2(x-3)^2+4$

$2(x^2-6x+9)+4$

$=2x^2-12x+18+4$

$=2x^2-12x+22$ >0 $=0$ <0 ≤ 0

II | I

III | IV

Expand those 8 (1st 4). See if you can get back to the original by completing the square or by $h = -\frac{b}{2a}$, $k = f(h)$

$$f(x) = a(x-h)^2 + k = ax^2 + bx + c$$

Solve $> 0, \geq 0, < 0, \leq 0, = 0$

Discriminant for $ax^2 + bx + c = 0$

$$b^2 - 4ac$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$