Intro to college math: Chapter 2.3
Solving Linear Equations in one Variable

* Linear equation one one variable: any equation that can be put in the form Ax + B = C.

* Contradiction: if the left side can never equal the right side. There is no solution.

ex.) $6x - 8 = 3 + 6x$

$-6x \quad -6x$

$-8 = 3$ ← Not true

* Identity: if the left side is always identically equal to the right side. The solution is "all real numbers".

ex.) $-15 + 3x = 3(x-5)$

$-15 + 3x = 3x - 15$

$-3x \quad -3x$

$-15 = -15$ ← always true so... "all real numbers"

1. Solve the following equation for the given variable. $3(x-1) = -15$

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$3x - 3 = -15$

$+3 \quad +3$

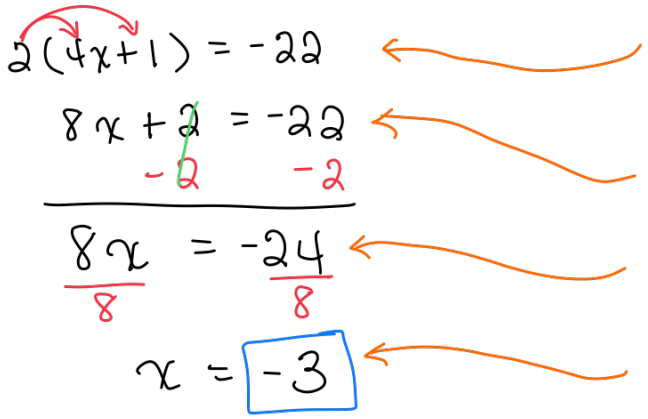
$3x = -12$

$\frac{3x}{3} = \frac{-12}{3}$

$x = -4$

* First use distributive property to get rid of ( ). Multiply the term outside the ( ) by both terms inside the ( ).
* Then move the number on the left to the right by doing the opposite (add/subtract).
* Then divide both sides by the number in front of the variable.

2. Solve the following equation for the given variable. $2(4x+1) = -22$

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* Then move the number on the left to the right by doing the opposite (add/subtract).
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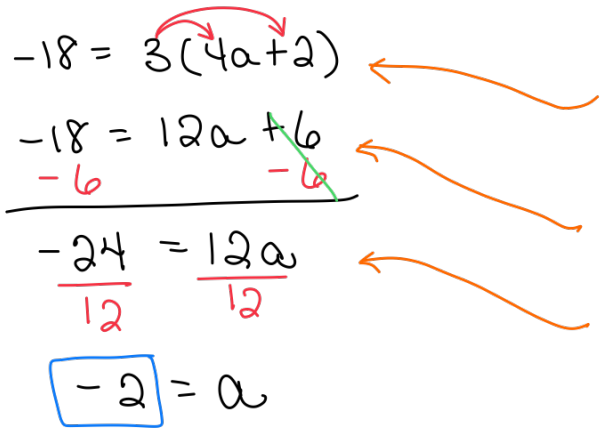
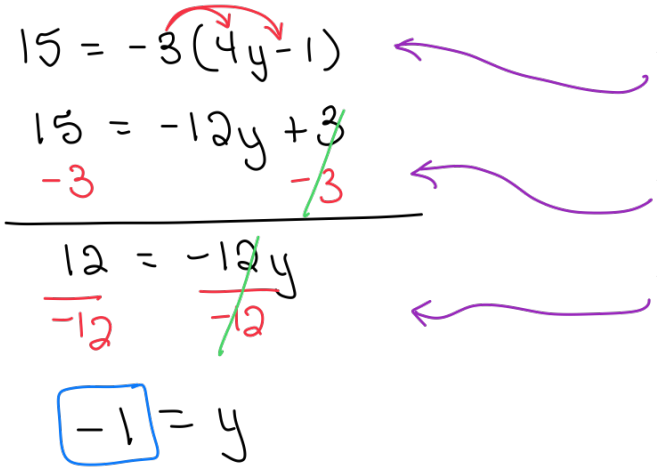
3. Solve the following equation for the given variable. $-18 = 3(4a+2)$




* First use distributive property to get rid of ( ). Multiply the negative sign outside the ( ) by both terms inside the ( ).
* Then move the number on the right to the left by doing the opposite (add/subtract).
* Then divide both sides by the number in front of the variable.

4. Solve the following equation for the given variable. $15 = -3(4y-1)$

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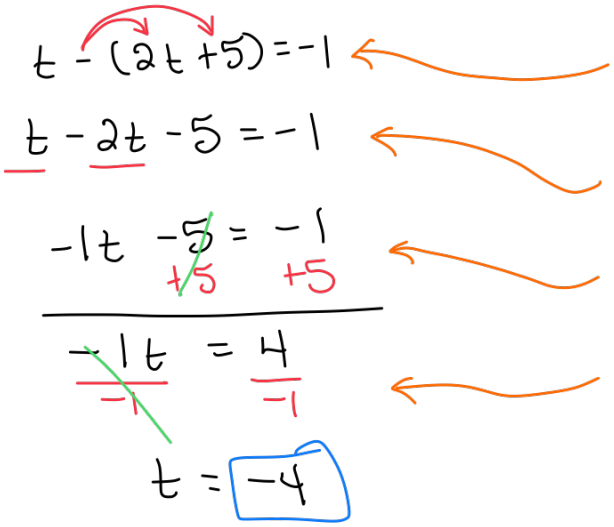
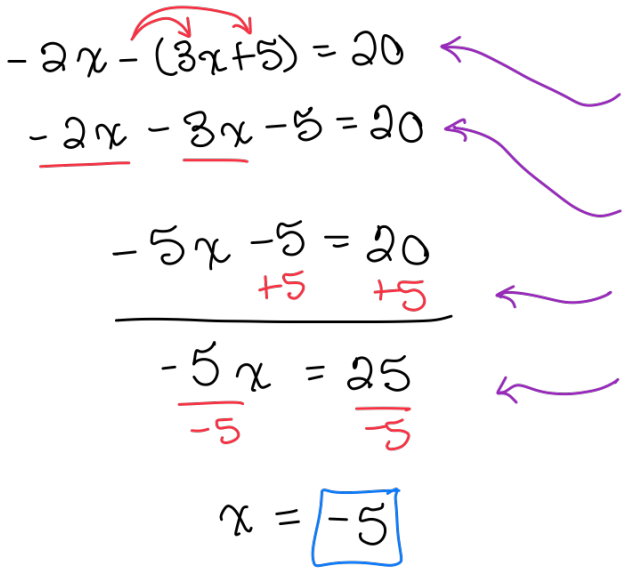
* Then move the number on the right to the left by doing the opposite (add/subtract).
* Then divide both sides by the number in front of the variable.

5. Solve the following equation for the given variable. $t-(2t+5)=-1$



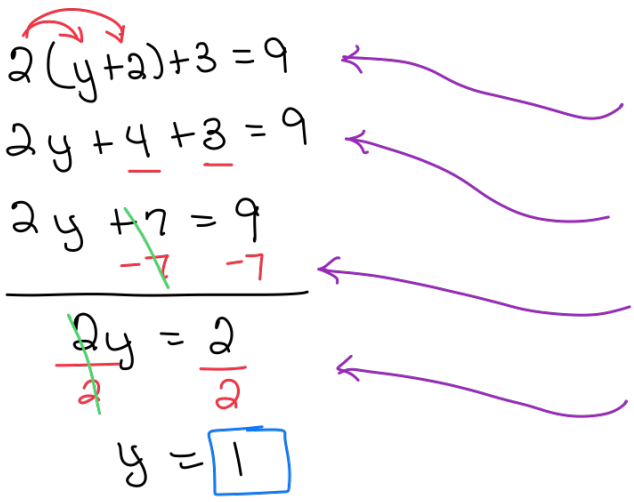

* First use distributive property to get rid of ( ). Multiply the negative sign outside the ( ) by both terms inside the ( ).
* Then combine like terms on either side of the equal sign.
* Then move the number on the left to the right by doing the opposite (add/subtract).
* Then divide both sides by the number in front of the variable.

6. Solve the following equation for the given variable. $-2x-(3x+5)=20$




* First use distributive property to get rid of ( ). Multiply the term outside the ( ) by both terms inside the ( ).
* Then combine like terms on either side of the equal
* Then move the number on the left to the right by doing the opposite (add/subtract).
* Then divide both sides by the number in front of the variable.

7. Solve the following equation for the given variable. $2(y+2)+3=9$

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* Then move the number on the left to the right by doing the opposite (add/subtract).
* Then divide both sides by the number in front of the variable.

8. Solve the following equation for the given variable. $3(4x-4)+1=-8$

$3(4x-4)+1=-8$

$12x-12+1=-8$

$12x-11=-8$

$+11 \quad +11$

$\frac{12x}{12}=\frac{3}{12}$

$x=\frac{1}{4}$

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* Then move the number on the left to the right by doing the opposite (add/subtract).
* Then divide both sides by the number in front of the variable.

9. Solve the following equation. $-0.5(4t+1)=0.5(3-2t)$

$-0.5(4t+1)=0.5(3-2t)$

$-2t-0.5=1.5-1t$

$+1t \quad +1t$

$-1t-0.5=1.5$

$+0.5 \quad +0.5$

$\frac{-1t}{-1}=\frac{2}{-1}$

$t=-2$

* First use distributive property to get rid of ( ). Multiply the term outside the ( ) by both terms inside the ( ).
* Move the variable on the right to the left by adding or subtracting.
* Then move the number on the left to the right by doing the opposite (add/subtract).
* Then divide both sides by the number in front of the variable.

10. Solve the following equation. $-2(3y+1)=3(4-y)+4$

$-2(3y+1)=3(4-y)+4$

$-6y-2=12-3y+4$

$-6y-2=16-3y$

$+3y \quad +3y$

$-3y-2=16$

$+2 \quad +2$

$\frac{-3y}{-3}=\frac{18}{-3}$

$y=-6$

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* Then divide both sides by the number in front of the variable.