Solving Linear Equation

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$$x + 1 = 3x - 7$$

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Here, x shows up in the equation in more than one place.

To solve for x, we will start by getting the x's together.

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$$x - x + 1 = 3x - x - 7$$

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$$1 = \cancel{x - x} + 1 = 3x - x - 7$$

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Now, we Adding 7 to both sides

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$$1 + 7 = 2x - 7 + 7$$

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$$1 = x\!\!-\!\!x + 1 = \underbrace{3x\!-\!x}_{2x} -7 = 2x - 7$$

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Finally, we need to Divide by 2 to solve for x:

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$$1 = x\cancel{-x} + 1 = \underbrace{3x\color{red}{-x}}_{2x} -7 = 2x - 7$$

$$1 = 2x - 7$$

Now, we Adding 7 to both sides

$$8 = 1\color{green}{+7} = 2x\cancel{-7}\color{green}{+7} = 2x$$

Finally, we need to Divide by 2 to solve for x:

$$\frac{8}{2} = \frac{2x}{2}$$

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$$4 = \frac{8}{2} = \frac{2x}{2} = x$$

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The solution to $x + 1 = 3x - 7$ is $x = 4$