

Name: \_\_\_\_\_

## U4:L3 Equations with Variable on Both Sides

Some equations are simple to solve, requiring only one step to solve.

Others are more complicated, requiring you to do more than one step.

For these more complicated equations, follow these steps:

1. <u>Simplify</u> the expressions on each side of the equation, including combining <u>like terms</u>	$\begin{aligned} -3x + 6x + 2x + 8 &= 2x + 20 \\ 5x + 8 &= 2x + 20 \\ -2x & \quad -2x \end{aligned}$
2. Get all <u>variable</u> terms on one side and all <u>constants</u> on the other side using the <u>addition</u> $\oplus/\ominus$ property of equality.	$\begin{aligned} 3x + 8 &= 20 \\ -8 & \quad -8 \\ \hline 3x &= 12 \\ \hline \frac{3x}{3} &= \frac{12}{3} \end{aligned}$
3. <u>Isolate</u> the variable using the <u>inverse</u> operation or multiplicative inverse ( <u>reciprocal</u> ). Make sure the variable has a coefficient of <u>1</u>	$x = 4$
4. <u>VERIFY</u> by plugging in your answer to your <u>variable</u> and proving the equality.	$\begin{aligned} -3x + 6x + 2x + 8 &= 2x + 20 \\ -3(4) + 6(4) + 2(4) + 8 &= 2(4) + 20 \\ -12 + 24 + 8 + 8 &= 8 + 20 \\ 12 + 8 + 8 &= 8 + 20 \\ 28 &= 28 \checkmark \end{aligned}$

Practice!

$$5x = 8x + 30$$

$$-4c + 7 = 6c - 3$$

$-3(3x + 5) = 6(x + 5)$

$3x + 5$	
$-3$	$-9x - 15$

$$-9x - 15 = 6x + 30$$
$$+9x \quad +9x$$

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$$-15 = 15x + 30$$
$$-30 \quad -30$$

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$$-45 = 15x$$
$$2x + 10 = 5x - 2$$

$\frac{-45}{15}$	$\frac{15x}{15}$
$-3$	$x$

$-3(3(-3) + 5) = 6(-3 + 5)$   
 $-3(-9 + 5) = 6(2)$   
 $-3(-4) = 12$   
 $+12 = 12 \checkmark$

10d 15d 40  
~~A store downtown rents a pair of skates with safety pads for \$15 a day if you have your own safety pads, they rent the skates for \$10 a day. The store sells safety pads for \$40. Write and solve an equation to figure out how many times you would need to rent skates to justify buying your own set of pads.~~

rent	buy	$\rightarrow d$
$15d$	$= 10d + 40$	
$-10d$	$-10d$	
$5d$	$= 40$	
$\frac{5d}{5}$	$\frac{40}{5}$	

$d = 8$

8 days of skating before you should buy

Suppose a video store charges nonmembers \$4 to rent each video. A store membership costs \$21 and members pay only \$2.50 to rent each video. For what number of videos is the cost the same?

A hairdresser is considering ordering a certain shampoo. Company A charges \$4 per 8-oz bottle plus a \$10 handling fee per order. Company B charges \$3 per 8-oz bottle plus a \$25 handling fee per order. How many bottles must the hairdresser buy to justify using Company B?