Lesson 2.4
Solving w/ Variables on Each Side

* You can remove any constant or variable as the first step!

1. \[ 8 + 5c = 7c - 2 \]
\[ -8 \]
\[ 5c = 7c - 10 \]
\[ -7c - 7c \]
\[ -2c = -10 \]
\[ -2 = -2 \]
\[ c = 5 \]

2. \[ -9 + 8k = 7 + 4k \]
\[ -4k \]
\[ -9 + 4k = 7 + 9 \]
\[ 4k = 16 \]
\[ 4k \]
\[ k = 4 \]

3. \[ 6(-3x + 1) = 5(-2x - 2) \]
\[ -18x + 6 = -10x - 10 \]
\[ -18x = -10x - 10 - 6 \]
\[ -10x = 10 \]
\[ -10x + 10x = 10 \]
\[ -8x = -16 \]
\[ x = 2 \]

4. \[ 2(3y + 7) = -4(3 - 2y) \]
\[ 6y + 14 = -12 + 8y \]
\[ 6y = 26 \]
\[ y = 3 \]

5. \[ \frac{2}{3}x - 6 = 6 - \frac{2}{3}x \]
\[ + \frac{2}{3}x \]
\[ \frac{4}{3}x = 12 \]
\[ x = 9 \]

6. \[ \frac{1}{2} - \frac{5}{8}x = \frac{7}{8}x + \frac{7}{2} \]
\[ \frac{5}{8}x + \frac{5}{8}x \]
\[ \frac{3}{2}x = \frac{7}{2} \]
\[ x = -2 \]
① \(-6y - 3 = 3 - 6y\)
\[
\begin{align*}
-6y + 3 &= 3 - 6y \\
+6y + 6y &= +6y \\
0 &= 6 \\
\text{false, } 0 \neq 6 \text{!}
\end{align*}
\]
\[\text{no solution}\]

⑧ \(8x + 12 = 4(2x + 3)\)
\[
\begin{align*}
8x + 12 &= 8x + 12 \\
-8x &= -8x \\
12 &= 12 \\
-12 &= -12 \\
0 &= 0 \\
\text{true!}
\end{align*}
\]
\[\text{all real #s}\]

⑨ Two-thirds of a number reduced by 11 is equal to 4 more than the number.
\[
\frac{2}{3}x - 11 = x + 4
\]
\[
\begin{align*}
\frac{2}{3}x &= x + 15 \\
-\frac{2}{3}x &= -x \\
(3) -\frac{1}{3}x &= 15(-3) \\
x &= -45
\end{align*}
\]

⑩ Five times the sum of a number and three is the same as three times the difference of twice the number and 1.
\[
5(x + 3) = 3(2x - 1)
\]
\[
\begin{align*}
5x + 15 &= 6x - 3 \\
-5x &= -5x \\
15 &= x - 3 \\
+3 &= +3 \\
18 &= x
\end{align*}
\]
\[x = 18\]