Section 1.2 Solving Linear Equations

(1st degree) - one is the highest exponent

a conditional equation is with one or no solution.

ex1 * a different approach

\[5x + 3 = 6 - 2x\]

* move across the equal sign and change the sign.

\[5x + 3 = 6 - 2x\]

\[5x + 3 = 6 - 2x\]

\[5x + 2x = 6 - 3\]

\[7x = 3\]

\[x = \frac{3}{7}\]

This is a conditional equation.

ex2 \[5y + 1 = 8y - 5 + 6y\]

\[1 + 5 = 8y + 6y - 5y\]

\[6 = 14y - 5y\]

\[6 = 9y\]

\[\frac{6}{9} = y\]

Conditional equation \[\frac{2}{3} = y\]

ex3 \[2x + 6 = 2(x + 4)\]

\[2x + 6 = 2x + 8\]

\[2x - 2x = 8 - 6\]

1) variable disappeared

No solution

2) False statement

Conditional equation

ex4 \[9x - 10 = 5x + 2(2x - 5)\]

\[9x - 10 = 5x + 4x - 10\]

\[9x - 10 = 9x - 10\]

\[9x - 9x = -10 + 10\]

\[0 = 0\]

1) variable disappeared

2) True statement

Solution set of all real numbers

Identity
1. A fraction = A fraction

\[
\frac{10x + 3}{5x + 6} = \frac{1}{2}
\]

* cross multiply

\[
2(10x + 3) = 1(5x + 6)
\]

\[
20x + 6 = 5x + 6
\]

\[
20x - 5x = 6 - 6
\]

\[
x = 0
\]

Conditional equation

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

\[
3(5x - 4) = 2(5x + 4)
\]

\[
15x - 12 = 10x + 8
\]

\[
15x - 10x = 8 + 12
\]

\[
5x = 20
\]

\[
x = 4
\]

Conditional equation

3. \[
\frac{100 - 4x}{3} = \frac{5x + 6 + 8}{4}
\]

* handy dandy method

\[
\frac{100 - 4x}{3} = \frac{1(5x + 6 + 16)}{4}
\]

\[
\frac{100 - 4x}{3} = \frac{5x + 24}{4}
\]

\[
\frac{100 - 4x}{3} = \frac{5x + 30}{4}
\]

\[
4(100 - 4x) = 3(5x + 30)
\]

\[
400 - 16x = 15x + 90
\]

\[
400 - 90 = 15x + 16x
\]

\[
310 = 31x
\]

\[
x = \frac{310}{31} = 10
\]

Conditional equation