**Multi-step Equations – Special Cases**

**So far we have looked at equations where there is exactly one solution. It is possible to have no solutions or infinite solutions to an equation.**

* **No solution would mean that there is no answer to the equation. It is impossible for the equation to be true no matter what value we assign to the variable.**

That can’t be right! We know that three doesn’t equal seven. It is a false statement to say 3 = 7, so we say that there can be **NO SOLUTION!**

 **Example: 2x + 3 = 2x + 7**

 **-2x -2x**\_\_\_

 **3 = 7**

**You try:** 9x + 3x – 10 = 3(3x + x)

* **Infinite solutions would mean that any value for the variable would make the equation true.**

When does three equal three? All the time! This means it doesn’t matter what value we substitute for x, the equation will always be true. Try two numbers to verify this is true. The answer would be **ALL SOLUTIONS!**

**Example: 2x + 3 = 2x + 3**

 **-2x -2x**\_\_\_

 **3 = 3**

**You try:** -3 – 8x + 17 = -2(4x – 7)

* **When the solution is ZERO: Zero can be an answer! Don’t get it confused with no solution!**

**Example: 2x + 3 = 3 You try: a + 5 = -5a + 5**

\_\_ **-3 -3**\_\_\_

 **2x = 0, x = 0**

**Can you…**

1. **Create an equation with an answer of all solutions?**
2. **Create an equation with an answer of no solution?**