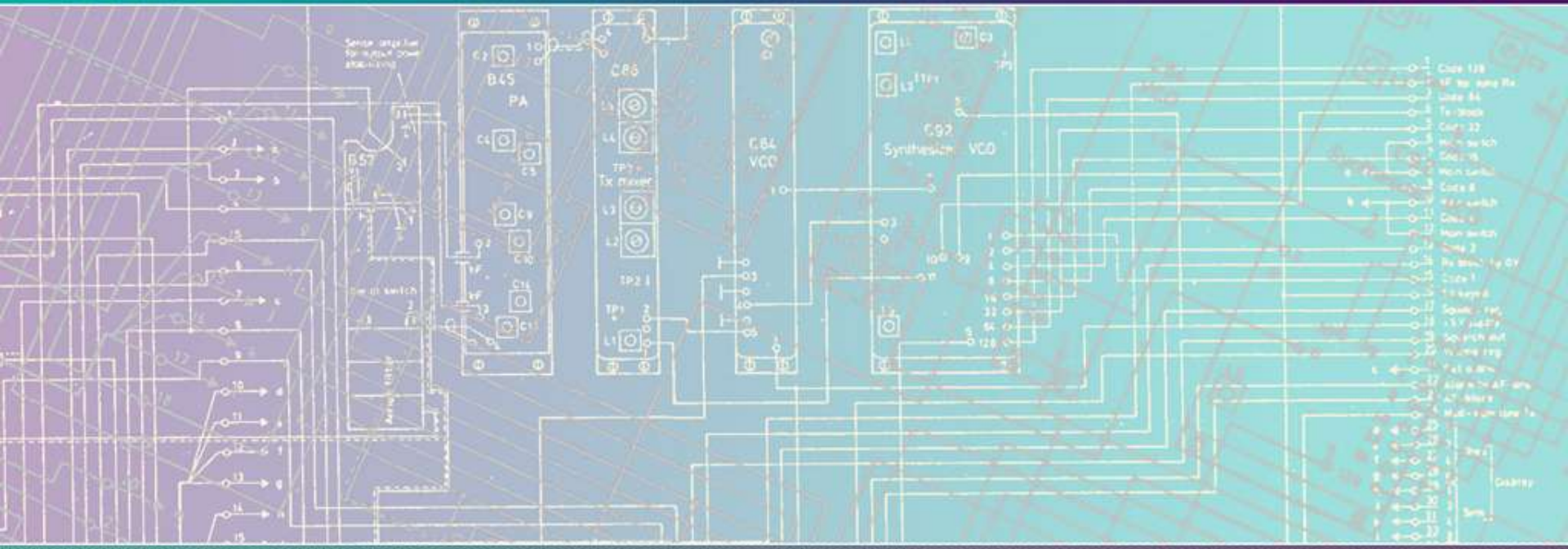

Inequalities

What is a “solution” to an inequality?

- A replacement that makes an inequality true is called a **solution**. The set of all solutions is called the **solution set**. When we have found the set of all solutions of an inequality, we say that we have **solved** the inequality.

Inequality Signs

- To solve an inequality you should know what the inequality signs look like and what they mean.
  - The symbol < is the “less than” sign and the small end points to the smaller number in the inequality.
  - The symbol > is the “greater than” sign and the wide end opens to the larger number in the inequality.
  - The symbol ≤ is the “less than or equal to” sign and means that the answer could be both less than **or** equal.
  - The symbol ≥ is the “greater than or equal to” sign and means that the answer could be both greater than **or** equal.

Examples of Inequalities

- $3 < 9$
  - This is a true statement because we know that 3 is a smaller number than the 9.
- $-9 > -6$
  - This is a false statement because -9 is further to the left on a number line when compared to -6.
- $10 \geq 9$
  - This is a true statement because 10 is larger than 9; however, it is not equal to 9. But remember that the symbol means “great than **OR** equal to”.

Solving Inequalities

- Solving an inequality isn't any different from solving a linear equation. We solve them the same way but have to remember one additional step:
  - When the last step in solving the problem is division by a negative number, the inequality symbol must be changed to its opposite.
  - Example: $-2x > 10$ (Divide by -2)

    $x < -5$

    You can check the answer to make sure you got it right by substituting any number less than -5 into the original problem. The statement should be true.

Practice

Which of these inequalities will change signs? Try them first and then check your answers on the next page.

$$-3x + 5 \leq -5x - 11$$

$$7(2x - 2) > 3x + 4$$

$$2 - 5(-x - 6) \leq 6x + 7$$

Practice Answers

$$-3x+5 \le -5x-11$$
$$5 \le -2x-11$$
$$16 \le -2x$$
$$8 \ge x$$

$$7(2x-2) > 3x+4$$
$$14x-14 > 3x+4$$
$$11x-14 > 4$$
$$11x > 18$$
$$x > \frac{18}{11}$$

$$2-5(-x-6) \le 6x+7$$
$$2+5x+30 \le 6x+7$$
$$5x+32 \le 6x+7$$
$$-x \le -26$$
$$x \ge 26$$