THEORETICAL PART:

Definitions:

- An equation is a statement that two expressions are equal.
- If the statement is always true for any allowable value(s) of the variable(s), then the equation is identity.
- If the statement is never true, it is a contradiction.
- If the equation is true for some values of the variables and false for others, then the equation is called **conditional**.
- Two equations that have the same solution set are called **equivalent equations**.

Definition: A **linear equation in one variable x** is an equation that can be transformed into the form $ax + b = 0$, where a and b are real numbers and $a \neq 0$. Such equations are also called **first-degree equations**, as x appears to the first power.

Remark. Solving absolute value equations:

$$|ax + b| = c \quad \text{means} \quad ax + b = c \quad \text{or} \quad -(ax + b) = c$$

Caution: Absolute value equations require to check your final answer in the original equation. An apparent solution that does not solve the original problem is called an **extraneous solution**.

Remark. Solving for a variable means to transform the equation into an equivalent one in which the specified variable is isolated on one side of the equation.

Important formulas:

- **Distance:** $d = rt$, where d is the distance traveled at rate r for time t.
- **Simple interest:** $I = Prt$, where I is the interest earned on principal P invested at rate r for time t.

PRACTICAL PART:

1. Identify types of the following equations:

   (a) $x^{\frac{1}{2}}(x + 1) = x^{\frac{3}{2}} + x^{\frac{1}{2}}$

(b) $t + 3 = t$

(c) $x^2 = 9$

2. Solve the following equations:

(a)

$$3(x - 2) + 7x = 1 - 2\left(x + \frac{1}{2}\right) =$$

(b)

$$5x + 12 = 5(x + 3) - 3$$

3. Solve the absolute value equations:

(a)

$$|3x - 2| = 1$$

(b)

$$|x - 4| = |2x + 1|$$

(c)

$$|6x - 7| + 5 = 3$$

4. Solve the following equations for the specified variable:

   (a) $P = 2l + 2w$; solve for w

   (b) $A = P\left(1 + \frac{r}{m}\right)^{mt}$; solve for P

5. The distance from Shreveport, LA to Austin, TX by one route is 325 miles. If Kevin made the trip in five and half hours, what was his average speed?